MDCAT (UHS entry test) — 2010 · Solved Past Paper

Body: University of Health Sciences, Lahore (UHS) · **Post:** MDCAT (UHS entry test) · **Year:** 2010 · **Questions:** 220 in the original paper — **219 solved and verified**, 1 excluded as defective (Q112) · **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 2010 sitting.

Source note: Question stems and options: UHS MDCAT 2010, Punjab (educationinkarachi.net/wp-content/uploads/2026/09/UHS-Punjab-MDCAT-2010-Original-Answer-Key.pdf, 32 pp.; Q1-220 with complete official answer-key table at the end, Q1-220, 0 dual-letter entries, 0 Cancelled). Exam held Tuesday 20 July 2010, 09:00 AM (UHS announcement via pakmed.net; result declared 2 Aug 2010; ~32,000 candidates, 23 centres in 12 cities; a separate special sitting was held Thu 14 Oct 2010 for candidates who missed 20 July — this paper is the main 20 July sitting). Printed key letter counts A64 / B38 / C58 / D60. Sections: Physics Q1-60, Chemistry Q61-120, English Q121-150, Biology Q151-220. Q125-Q130 (English error-spotting) are absent from the text layer and were recovered from the PDF's own embedded images (options are the four underlined segments). Q112 is the single gap (option D absent from the source) and is filed as the single DEFECTIVE-excluded record. 2 PICK-ONE (Q118, Q138). 5 printed-key errors corrected on textbook evidence (Q2 A to C, Q3 C to B, Q5 C to B, Q153 D to B, Q154 B to D), each recorded in its explanation; the archive.org stems match the reproduction word for word, so these are genuine key errors, not stem mismatches. 3 section-header leaks (Q60/Q120/Q150 option D) and Q220 option D footer junk were stripped. Answers verified independently against reference facts, worked derivations and targeted sources, never

nted key alone. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

Question 1 Which one is the highest power

Which one is the highest power multiple?

- A. Giga
- B. Tera ✓ **Correct answer**
- C. Mega
- D. Deca

A. wrong: giga is 10^9, smaller than tera.

B. correct: tera is 10^12, the largest power multiple among the options (giga 10^9, mega 10^6, deca 10^1).

C. wrong: mega is 10^6, smaller than tera.

D. wrong: deca is 10^1, the smallest of the options.

Question 2 SI unit of charge is

SI unit of charge is _____.

- A. Ampere
- B. Volt
- C. Coulomb ✓ **Correct answer**
- D. Calorie

A. The printed key: wrong: the ampere is the SI unit of electric current, not of charge.

B. wrong: the volt is the SI unit of electric potential.

C. correct: the coulomb is the SI unit of electric charge (1 C = 1 A·s).

D. wrong: the calorie is a unit of heat energy, not of charge. (PRINTED-KEY ERROR

the printed key records A (Ampere), but the SI unit of charge is the coulomb, so the answer is corrected to C. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 3 The electrical analog of mass is

The electrical analog of mass is electricity is _____.

- A. Capacitance
- B. Inductance ✓ **Correct answer**
- C. Charge
- D. Resistance

A. wrong: in the mechanical-electrical analogy capacitance corresponds to the reciprocal of the spring constant (1/k), not to mass.

B. correct: in the mechanical-electrical analogy the inductance L corresponds to the mass m (magnetic energy 1/2 LI^2 matches kinetic energy 1/2 mv^2).

C. The printed key: wrong: charge corresponds to displacement in the analogy, not to mass.

D. wrong: resistance corresponds to damping, not to mass. (PRINTED-KEY ERROR CORRECTED: the printed key records C (Charge), but the electrical analog of mass is the inductance, so the answer is corrected to B. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 4 Which one of the following relations

Which one of the following relations is correct?

- A. 1 wb m-2 = N m-1 A-1
- B. 1 Tesla = 10^4 Gausses
- C. 1 wb m-2 = 1 Tesla
- D. All of these ✓ **Correct answer**

tesla = 1 N A-1 m-1, and 1 Wb m-2 = 1 tesla.

B. correct: 1 tesla equals 10^4 gauss.

C. correct: one weber per square metre is one tesla by definition.

D. correct: since A, B and C are each correct, all of them are correct.

Question 5 Life time of electron in metastable

Life time of electron in metastable state is about _____.

- A. 10^-5 sec
- B. 10^-3 sec ✓ **Correct answer**
- C. 10^-8 sec
- D. 10^-2 sec

A. wrong: this is neither the metastable nor the ordinary excited-state lifetime.

B. correct: the metastable state is the long-lived excited state in which the electron stays for about 10^-3 s, much longer than the ordinary excited state (10^-8 s) — this long lifetime is what makes laser action (population inversion) possible.

C. The printed key: wrong: 10^-8 s is the lifetime of the ordinary excited state, not the metastable state.

D. wrong: the metastable lifetime is about 10^-3 s, not 10^-2 s. (PRINTED-KEY ERROR CORRECTED: the printed key records C (10^-8 sec), but that is the ordinary excited-state lifetime; the metastable-state lifetime is about 10^-3 sec, so the answer is corrected to B. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 6 The torque acting on a current

The torque acting on a current carrying coil is given by _____.

- A. τ = NIAB cos α ✓ **Correct answer**

- B. τ = BIL sin α
- C. τ = NIAB sin α
- D. τ = BIL cos α

A. correct: the torque on a coil of N turns carrying current I in a field B is τ = NIAB cos α, where α is the angle between the plane of the coil and the magnetic field.

B. wrong: this is the force on a straight conductor, not the torque on a coil.

C. wrong: with α measured from the plane of the coil the torque goes as cos α, not sin α.

D. wrong: this omits the number of turns N and the coil area A, and is a force form rather than the coil torque.

Question 7 The grid in the cathode ray

The grid in the cathode ray oscilloscope _____.

- A. Controls number of waves
- B. Controls the brightness of spot formed ✓ **Correct answer**
- C. Accelerates electrons
- D. Has positive potential with respect to cathode

A. wrong: the grid does not control the number of waves displayed.

B. correct: the grid (control grid) regulates the number of electrons reaching the screen and so controls the brightness of the spot.

C. wrong: the accelerating anodes accelerate the electrons, not the grid.

D. wrong: the grid is at a negative potential with respect to the cathode, which is how it controls the electron flow.

Question 8 The horizontal range of a projectile

The horizontal range of a projectile, at a certain place, is completely determined by

angle of projection ✓ **Correct answer**

- B. The initial velocity of projection
- C. The mass of the projectile
- D. Speed and mass of the projectile

A. correct: for a given velocity of projection the horizontal range R = v^2 sin 2θ / g is determined by the angle of projection θ (and is maximum at 45°).

B. wrong: the velocity alone does not fix the range; the angle matters too, and the keyed answer is the angle.

C. wrong: the range does not depend on the mass of the projectile.

D. wrong: the mass plays no part in the range.

Question 9 If velocity is double then

If velocity is double, then.

- A. Momentum increase 4 times and K.E increases 2 times
- B. Momentum and K.E remain same
- C. Momentum increases 2 times and K.E increase constant
- D. Momentum increases 2 times and K.E increases 4 times ✓ **Correct answer**

A. wrong: the factors are reversed.

B. wrong: both change when the velocity changes.

C. wrong: the kinetic energy does not stay constant; it increases fourfold.

D. correct: momentum p = mv doubles when v doubles, and kinetic energy 1/2 mv^2 quadruples.

Question 10 The consumption of energy by 60-watt

The consumption of energy by 60-watt bulb in 2 seconds is:

- B. 120 J ✓ **Correct answer**
- C. 30 J
- D. 0.02 J

A. wrong: 60 W for 2 s is not 20 J.

B. correct: energy = power × time = 60 W × 2 s = 120 J.

C. wrong: 60 × 2 is 120, not 30.

D. wrong: this is far too small.

Question 11 In transistors the base region is

In transistors, the base region is very thin, of the order of

- A. 10^-5 cm
- B. 10^-6 m ✓ **Correct answer**
- C. 10^-6 mm
- D. 10^-6 μm

A. wrong: the base is thinner than this (10^-5 cm = 10^-7 m).

B. correct: the base region of a transistor is very thin, of the order of 10^-6 m (one micrometre).

C. wrong: 10^-6 mm = 10^-9 m, far too thin.

D. wrong: 10^-6 μm = 10^-12 m, far too thin.

Question 12 The closed loop gain of OP-AMP

The closed loop gain of OP-AMP depends on

- A. Internal structure of OP-AMP
- B. Externally connected resistances ✓ **Correct answer**

age of power supplies

- D. Input resistance

A. wrong: the closed-loop gain is set by the external circuit, not the internal structure.

B. correct: the closed-loop gain of an op-amp is fixed by the ratio of the externally connected feedback and input resistances.

C. wrong: the supply voltages set the saturation limits, not the gain.

D. wrong: the gain depends on the feedback network, not on the input resistance alone.

Question 13 The net charge on an N-type

The net charge on an N-type substance is

- A. 0.7 volts ✓ **Correct answer**
- B. 0.3 volts
- C. 0.25 volts
- D. 0.07 volts

A. correct as keyed: the intended question is the barrier potential of silicon, which is 0.7 V (germanium is 0.3 V). Note: the stem as printed asks for the 'net charge on an N-type substance' while all four options are voltages, so the stem is garbled; the question the options and the key actually ask is the barrier potential, and 0.7 V is its silicon value.

B. wrong: 0.3 V is the barrier potential of germanium, not silicon.

C. wrong: this is not the barrier potential of silicon.

D. wrong: this is far below the silicon barrier potential.

Question 14 The value of Wiens constant is

The value of Wien’s constant is

- A. 2.90 x 10^-3 mK ✓ **Correct answer**

- 4 x 10^-4 mK
- C. 4.22 x 10^-7 mK
- D. 3.42 x 10^-8 mK

A. correct: Wien's displacement constant b = 2.90 × 10^-3 m·K (λmax T = b).

B. wrong: this is not Wien's constant.

C. wrong: this is not Wien's constant.

D. wrong: this is not Wien's constant.

Question 15 The minimum frequency below which no

The minimum frequency below which no electron is emitted from the metal surface is called

- A. High frequency
- B. Low frequency
- C. Threshold frequency ✓ **Correct answer**
- D. Resonance frequency

A. wrong: the cut-off is named for the threshold, not for being high.

B. wrong: the cut-off is named for the threshold, not for being low.

C. correct: the minimum frequency below which no photoelectrons are emitted is the threshold frequency.

D. wrong: resonance frequency belongs to oscillating systems, not to the photoelectric cut-off.

Question 16 In pair production the type of

In pair production, the type of photon used

- A. α-particle

article

- C. X-rays
- D. γ-radiations ✓ **Correct answer**

A. wrong: an alpha particle is a helium nucleus, not the photon used in pair production.

B. wrong: a beta particle is an electron, not the photon used in pair production.

C. wrong: ordinary X-rays are below the 1.02 MeV pair-production threshold.

D. correct: pair production needs a high-energy gamma photon (at least 1.02 MeV, the rest energy of the electron-positron pair).

Question 17 The life time of an electron

The life time of an electron in an excited state is about 10^-8 s. What is its uncertainty in energy during this time?

- A. 1.05 x 10^-41 J
- B. 1.05 x 10^-26 J ✓ **Correct answer**
- C. 1.15 × 10^10 J
- D. 2.19 x 10^-40 J

A. wrong: this is far too small; it would come from using a much longer lifetime.

B. correct: by the uncertainty relation ΔE·Δt ≈ ħ, ΔE ≈ ħ/Δt = (1.05 × 10^-34 J·s)/(10^-8 s) = 1.05 × 10^-26 J.

C. wrong: this is absurdly large and has the wrong sign of exponent.

D. wrong: this does not follow from ΔE ≈ ħ/Δt with Δt = 10^-8 s.

Question 18 Velocity of electron moving in first

Velocity of electron moving in first orbit of hydrogen is

- A. 2.19 × 10^7 m/sec

- C. 2.2 × 10^8 m/sec
- D. 2.19 × 10^6 m/sec ✓ **Correct answer**

A. wrong: this is ten times too large.

B. wrong: this is ten times too large.

C. wrong: this is a hundred times too large and close to the speed of light.

D. correct: the Bohr velocity in the first orbit of hydrogen is v = 2.19 × 10^6 m/s.

Question 19 LASER is a potential energy source

LASER is a potential energy source for inducing which type of reaction?

- A. Radioactive
- B. Fission
- C. Ionization
- D. Fusion ✓ **Correct answer**

A. wrong: lasers do not induce radioactivity.

B. wrong: lasers are not used to induce fission.

C. wrong: laser-induced fusion, not ionisation, is the energy application in view.

D. correct: a laser is a potential energy source for inducing fusion reactions (laser-driven inertial-confinement fusion).

Question 20 In the half-life of an element

In the half-life of an element, the equation for the number of decaying atoms is given by

- A. ΔN ∝ -NΔt ✓ **Correct answer**
- B. ΔN = KNΔt
- C. ΔN ∝ -nΔt

A. correct: the decay law is ΔN/Δt = -λN, so the number decaying in Δt is proportional to -NΔt.

B. wrong: this omits the minus sign (the number decreases) and writes the constant as K.

C. wrong: the decay is proportional to the number N present, not to a small number n.

D. wrong: this is dimensionally and logically wrong (ΔN on both sides).

Question 21 Decay constant is given as

Decay constant ‘λ’ is given as

- A. - ΔN/N Δt ✓ **Correct answer**
- B. - ΔN Δt
- C. - N Δt
- D. ΔN/N Δt

A. correct: the decay constant λ = -(ΔN/N)/Δt = -ΔN/(NΔt).

B. wrong: this omits the division by N.

C. wrong: this is not the decay constant.

D. wrong: this omits the minus sign.

Question 22 The SI unit of absorbed dose

The SI unit of absorbed dose ‘D’ i.e. radiation effect is Gray and one Gray is equal to

- A. kJ / mol
- B. J / mol
- C. kg / J
- D. J / kg ✓ **Correct answer**

is is an energy per mole, not a dose.

B. wrong: this is an energy per mole, not a dose.

C. wrong: this is the reciprocal of the dose unit.

D. correct: one gray (absorbed dose) is one joule of energy absorbed per kilogram of matter.

Question 23 The principle of homogeneity of dimensions

The principle of homogeneity of dimensions determines

- A. Only variable in the equation
- B. Only constant in the equation
- C. Correctness of an equation ✓ **Correct answer**
- D. Constant and variable in the equation

A. wrong: homogeneity checks the whole equation, not only its variables.

B. wrong: homogeneity checks the whole equation, not only its constants.

C. correct: the principle of homogeneity of dimensions is used to check whether an equation is dimensionally correct.

D. wrong: the principle determines the correctness of the equation as a whole, not the constants and variables separately.

Question 24 For a body to be in

For a body to be in complete equilibrium

- A. Linear acceleration is zero
- B. Angular acceleration is zero
- C. Linear acceleration is zero but angular acceleration is not zero
- D. Linear acceleration and angular acceleration both should be zero ✓ **Correct**

A. wrong: this alone is not complete equilibrium; rotation must also be absent.

B. wrong: this alone is not complete equilibrium; translation must also be absent.

C. wrong: complete equilibrium needs the angular acceleration to be zero as well.

D. correct: complete equilibrium requires zero resultant force (no linear acceleration) and zero resultant torque (no angular acceleration).

Question 25 If length of a spanner is

If length of a spanner is ‘I’ and a force ‘F’ is applied on it to tighten a nut such that it passes through the pivot point, then torque is

- A. Zero ✓ **Correct answer**
- B. Ff
- C. Fl sin θ
- D. Fl sin θλ

A. correct: torque = force × perpendicular distance from the pivot; a force passing through the pivot has zero moment arm, so the torque is zero.

B. wrong: the torque is not the product of force and the length when the line of action passes through the pivot.

C. wrong: the sin θ form applies when the force acts at an angle at a distance l from the pivot, not through it.

D. wrong: this is not a torque expression.

Question 26 If a force of magnitude 8

If a force of magnitude 8 N acts on a body in direction making an angle 30, its x and y components will be

4√3 and Fy = 8

- B. Fx = 8 and Fy = 4√3
- C. Fx = 4√3 and Fy = 4 ✓ **Correct answer**
- D. Fx = 8√3 and Fy = 4

A. wrong: Fy is 8 sin 30° = 4, not 8.

B. wrong: the components are swapped (Fx uses cos 30°, Fy uses sin 30°).

C. correct: Fx = 8 cos 30° = 8 × (√3/2) = 4√3 N, and Fy = 8 sin 30° = 8 × (1/2) = 4 N.

D. wrong: Fx is 4√3, not 8√3.

Question 27 The difference of a vector B

The difference of a vector B⃗ and its negative vector −⃗ is

- A. A null vector
- B. Equal to magnitude of vector $\vec{B}$
- C. Twice the magnitude of vector $\vec{B}$ ✓ **Correct answer**
- D. Smaller than magnitude of vector $\vec{B}$

A. wrong: $\vec{B} - (-\vec{B})$ is not zero.

B. wrong: the difference is twice the vector, not once.

C. correct: $\vec{B} - (-\vec{B}) = \vec{B} + \vec{B} = 2\vec{B}$, whose magnitude is twice the magnitude of $\vec{B}$.

D. wrong: the difference is larger, not smaller.

Question 28 Time of projectiles flight is

Time of projectile’s flight is

- A. vi2 sin2 θ g
- B. 2vi sin θ g ✓ **Correct answer**
- C. vi2 sin θ g

g sin 2θ

A. wrong: vi^2 sin 2θ / g is the horizontal range, not the time of flight.

B. correct: the time of flight is T = 2vi sin θ / g.

C. wrong: vi^2 sin θ / g is not the time of flight.

D. wrong: this is not the time-of-flight formula.

Question 29 If the velocity of the body

If the velocity of the body changes by equal amount in equal intervals of time, the body is said to have:

- A. variable acceleration
- B. uniform acceleration ✓ **Correct answer**
- C. uniform velocity
- D. negative acceleration

A. wrong: equal velocity changes in equal times mean the acceleration does not vary.

B. correct: if the velocity changes by equal amounts in equal intervals of time, the acceleration is uniform (constant).

C. wrong: the velocity is changing, so it is not uniform.

D. wrong: the acceleration need not be negative; it is constant.

Question 30 In order to determine the maximum

In order to determine the maximum height of the projectile, the equation of motion used is

- A. aS = vf 2 - vi 2
- B. 2aS = vf 2 - vi 2 ✓ **Correct answer**
- C. 2S = a vf 2 - vi 2

A. wrong: the third equation of motion has 2aS on the left, not aS.

B. correct: the equation vf^2 − vi^2 = 2aS (so 2aS = vf^2 − vi^2) is used to find the maximum height (where vf = 0).

C. wrong: this rearranges the equation incorrectly.

D. wrong: this rearranges the equation incorrectly.

Question 31 If a force of 12 N

If a force of 12 N acts on a car and changes its momentum from 36 kgm/sec to 60 kgm/sec, the time during which this change occurs will be

- A. 24 sec
- B. 2 sec ✓ **Correct answer**
- C. 12 sec
- D. 8 sec

A. wrong: 24 is the change in momentum, not the time.

B. correct: impulse F·t = change in momentum, so t = (60 − 36)/12 = 24/12 = 2 s.

C. wrong: this is the force, not the time.

D. wrong: (60 − 36)/12 = 2, not 8.

Question 32 Which one of the following is

Which one of the following is a non-conservative force?

- A. Electric force
- B. Elastic spring force
- C. Gravitational force
- D. Frictional force ✓ **Correct answer**

e electric force is conservative.

B. wrong: the spring force is conservative.

C. wrong: the gravitational force is conservative.

D. correct: friction is a non-conservative (dissipative) force; the work it does depends on the path.

Question 33 Value of escape velocity for the

Value of escape velocity for the surface of the earth is 11 km/sec. Its value for surface of the moon is

- A. 11 km/sec
- B. 10.4 km/sec
- C. 2.4 km/sec ✓ **Correct answer**
- D. 4.3 km/sec

A. wrong: 11 km/s is the escape velocity from the Earth, not the Moon.

B. wrong: this is close to the Earth's value, not the Moon's.

C. correct: the escape velocity from the Moon's surface is about 2.4 km/s (the Moon's gravity is much weaker).

D. wrong: this is neither the Moon's nor the Earth's escape velocity.

Question 34 On a clear day at noon

On a clear day at noon, the intensity of solar energy reaching the earth’s surface is about

- A. 1.0 kWm-2 ✓ **Correct answer**
- B. 1.4 kWm-2
- C. 1.0 Wm-2
- D. 1.4 Wm-2

n a clear day at noon the solar intensity reaching the Earth's surface is about 1.0 kW/m^2 (the solar constant, 1.4 kW/m^2, is the value at the top of the atmosphere before absorption).

B. wrong: 1.4 kW/m^2 is the solar constant at the top of the atmosphere, not the value at the surface.

C. wrong: this is a thousand times too small.

D. wrong: this is a thousand times too small.

Question 35 When a lift is accelerated upward

When a lift is accelerated upward, the apparent weight of an object in it will be

- A. Equal to its real weight
- B. Less than its real weight
- C. Zero
- D. Greater than its real weight ✓ **Correct answer**

A. wrong: the apparent weight changes when the lift accelerates.

B. wrong: the apparent weight increases, not decreases, when the lift accelerates upward.

C. wrong: the apparent weight is zero only in free fall, not when accelerating upward.

D. correct: apparent weight = m(g + a) when the lift accelerates upward, which is greater than the real weight mg.

Question 36 The moment of inertial of a

The moment of inertial of a thin rod is

- A. 1 2 mL2
- B. 1 4 m3L
- C. 1 12 mL

2 mL2 ✓ **Correct answer**

A. wrong: (1/2)mL^2 is the moment of inertia of a rod about one end only in a different form (actually (1/3)mL^2 about an end; (1/2)mL^2 is not the rod's value).

B. wrong: this is dimensionally wrong (m^3 L).

C. wrong: this is missing one power of L.

D. correct: the moment of inertia of a thin rod about its centre is (1/12)mL^2.

Question 37 A wheel of radius 1 m

A wheel of radius 1 m covers an angular displacement of 180. Its linear displacement is

- A. 3.14 m ✓ **Correct answer**
- B. π rad
- C. 6.28 m
- D. 0.157 m

A. correct: the angle 180° = π radians, so the linear displacement s = rθ = 1 m × π = 3.14 m.

B. wrong: π rad is the angular displacement, not the linear displacement.

C. wrong: 6.28 m would be the circumference (2π r), not the displacement for half a turn.

D. wrong: this is far too small.

Question 38 Conservation of mass of fluid flow

Conservation of mass of fluid flow leads to

- A. Bernoulli’s equation
- B. Venturi meter
- C. Equation of motion
- D. Equation of continuity ✓ **Correct answer**

rnoulli's equation follows from conservation of energy, not of mass.

B. wrong: a venturi meter is a device that uses Bernoulli's principle, not a consequence of mass conservation.

C. wrong: the equation of motion follows from Newton's laws, not from mass conservation.

D. correct: conservation of mass in fluid flow gives the equation of continuity (A1 v1 = A2 v2).

Question 39 The blood vessels collapse when

The blood vessels collapse when

- A. External pressure applied becomes greater than the systolic pressure ✓ **Correct answer**
- B. External pressure applied is equal to systolic pressure
- C. External pressure applied is less than the systolic pressure
- D. External pressure applied is zero

A. correct: a blood vessel collapses when the external pressure exceeds the blood pressure inside it (the systolic pressure).

B. wrong: at equality the vessel is on the point of collapse but the flow is just stopped, not collapsed.

C. wrong: the vessel stays open when the internal pressure is higher.

D. wrong: with no external pressure the vessel is fully open.

Question 40 An oscillating body is at mean

An oscillating body is at mean position at t = 0. At t = T/4 it will be at

- A. Extreme position ✓ **Correct answer**

an position

- C. Between extreme and mean position
- D. Beyond extreme position

A. correct: in simple harmonic motion the body starting at the mean position at t = 0 reaches an extreme position after a quarter of a period (t = T/4).

B. wrong: the body returns to the mean position after half a period (t = T/2).

C. wrong: at exactly t = T/4 the body is at the extreme.

D. wrong: the body cannot go beyond the extreme position.

Question 41 In a simple pendulum the tension

In a simple pendulum, the tension of the string is

- A. g cos θ
- B. mg sin θ
- C. mg cos θ ✓ **Correct answer**
- D. mg

A. wrong: this omits the mass; the tension is a force (mg cos θ).

B. wrong: mg sin θ is the restoring component along the arc, not the tension.

C. correct: at the extreme position, where the velocity is zero, the tension in the string is mg cos θ.

D. wrong: the tension equals mg only at the lowest point (and only when the string is vertical with no extra centripetal term); in general it is mg cos θ at the extremes.

Question 42 Two sound waves having the same

Two sound waves having the same amplitudes are moving in the same direction are out of phase. The amplitude of the resultant wave is

- o amplitude ✓ **Correct answer**
- B. The sum of amplitude of the two waves
- C. Difference of the amplitudes of the two waves
- D. Double the amplitude of either wave

A. correct: two waves of equal amplitude moving in the same direction but out of phase interfere destructively, giving zero resultant amplitude.

B. wrong: the amplitudes add only for in-phase (constructive) interference.

C. wrong as the answer: this states how the resultant amplitude is calculated, but the question asks for the amplitude itself, which is zero.

D. wrong: doubling happens only for in-phase waves.

Question 43 A source Y of unknown frequency

A source ‘Y’ of unknown frequency produces 4 beats with a source of 240 Hz and 8 beats with a sound of 252 Hz. Frequency of the source ‘Y’ is

- A. 244 Hz ✓ **Correct answer**
- B. 236 Hz
- C. 248 Hz
- D. 246 Hz

A. correct: Y gives 4 beats with 240 Hz, so Y = 236 or 244 Hz; Y gives 8 beats with 252 Hz, so Y = 244 or 260 Hz; the common value is 244 Hz.

B. wrong: 236 Hz would give 16 beats with 252 Hz, not 8.

C. wrong: 248 Hz would give 8 beats with 240 Hz, not 4.

D. wrong: 246 Hz would give 6 beats with both sources, not 4 and 8.

44 An organ pipe closed at one

An organ pipe closed at one end has a length of 25 cm. Wavelength of the fundamental note is

- A. 25 cm
- B. 50 cm
- C. 100 cm ✓ **Correct answer**
- D. 75 cm

A. wrong: 25 cm is the pipe length, not the wavelength.

B. wrong: 50 cm is twice the length, not four times.

C. correct: for a pipe closed at one end the fundamental wavelength is $\lambda = 4L = 4 \times 25\ \text{cm} = 100\ \text{cm}$.

D. wrong: this is three times the length, not four times.

Question 45 In Newton ring apparatus at the

In Newton ring apparatus, at the point of contact of the lens and glass plate, the additional path difference introduced is

- A. $\lambda/4$
- B. $\lambda/2$ ✓ **Correct answer**
- C. λ
- D. $\lambda/3$

A. wrong: the additional path difference at the point of contact is half a wavelength, not a quarter.

B. correct: at the point of contact the light reflected from the glass plate suffers a phase change of π, introducing an additional path difference of $\lambda/2$.

C. wrong: the additional path difference is $\lambda/2$, not λ.

e additional path difference is λ/2, not λ/3.

Question 46 The path difference BD for destructive

The path difference ‘BD’ for destructive interference is

- A. (m + ½) λ ✓ **Correct answer**
- B. mλ
- C. d sin θ
- D. 3λ

A. correct: destructive interference occurs when the path difference is an odd multiple of half a wavelength, (m + 1/2)λ.

B. wrong: mλ is the condition for constructive interference.

C. wrong: d sin θ is the path difference for a grating/double slit, not the destructive condition itself.

D. wrong: 3λ is a whole multiple of λ, which gives constructive interference.

Question 47 In the case of a grafting

In the case of a grafting spectrometer, the resolving power ‘R’ of the grating is defined as

- A. λ / Δλ ✓ **Correct answer**
- B. λ / D
- C. λ / λ1
- D. N x m

A. correct: the resolving power of a grating is defined as R = λ/Δλ (the wavelength divided by the smallest resolvable wavelength difference).

B. wrong: this is not the definition of resolving power.

C. wrong: this is not the definition of resolving power.

the definition. R = Nm gives the value of the resolving power in terms of the number of lines N and the order m, but the question asks for the definition, which is λ/Δλ.

Question 48 Which one of the following lights

Which one of the following lights travels fastest in optical fibers?

- A. Visible light
- B. Ultraviolet light
- C. Ordinary light
- D. Invisible infrared light ✓ **Correct answer**

A. wrong: visible light travels slower in the fibre than infrared.

B. wrong: ultraviolet has a higher refractive index in glass and travels slower.

C. wrong: this is not the fastest in the fibre.

D. correct: infrared has the longest wavelength and the lowest refractive index in the glass fibre, so it travels fastest in the fibre.

Question 49 The value of universal gas constant

The value of universal gas constant is

- A. 8.314 Jmol-1K-1 ✓ **Correct answer**
- B. 8.324 Jmol-1K-1
- C. 7.23 Jmol-1K-1
- D. 1.00 Jmol-1K-1

A. correct: the universal gas constant R = 8.314 J mol^-1 K^-1.

B. wrong: the value is 8.314, not 8.324.

C. wrong: this is not the gas constant.

D. wrong: this is far too small.

50 The turbine in a steam power

The turbine in a steam power plant takes steam from a boiler at 427°C and exhausts into a low temperature reservoir at 77°C. What is the maximum possible efficiency?

- A. 50% ✓ **Correct answer**
- B. 40%
- C. 60%
- D. 70%

A. correct: the maximum (Carnot) efficiency is 1 − Tc/Th = 1 − (77 + 273)/(427 + 273) = 1 − 350/700 = 0.50, i.e. 50%.

B. wrong: the Carnot efficiency is 50%, not 40%.

C. wrong: the Carnot efficiency is 50%, not 60%.

D. wrong: the Carnot efficiency is 50%, not 70%.

Question 51 Which one of the following is

Which one of the following is a postulate of kinetic theory of gases?

- A. Molecules do not exert force on each other ✓ **Correct answer**
- B. The size of molecules is much larger than separation between the molecules
- C. A finite volume of gas consists of a very small number of molecules
- D. The gas molecules are not in random motion

A. correct: a postulate of the kinetic theory is that the gas molecules exert no force on one another (except during collisions).

B. wrong: the postulate is the opposite — the molecules are point masses whose size is negligible compared with their separation.

C. wrong: a finite volume contains a very large number of molecules.

D. wrong: the molecules are in continuous random motion.

52 Which one is not an irreversible

Which one is not an irreversible process?

- A. Slow compression of a gas into a cylinder ✓ **Correct answer**
- B. Changes due to friction
- C. Explosion
- D. Dissipation of energy

A. correct: a slow (quasi-static) compression is reversible, so it is not an irreversible process.

B. wrong: friction makes a process irreversible.

C. wrong: an explosion is irreversible.

D. wrong: dissipation of energy is irreversible.

Question 53 Electric intensity is a vector quantity

Electric intensity is a vector quantity and its direction is

- A. Perpendicular to the direction of field
- B. Opposite to the direction of force
- C. At a certain angle
- D. Along the direction of force ✓ **Correct answer**

A. wrong: the intensity points along the field, not across it.

B. wrong: the intensity points in the same direction as the force on a positive charge.

C. wrong: the intensity is exactly along the force direction, not at an angle.

D. correct: the electric intensity at a point is in the direction of the force experienced by a positive test charge placed there.

54 The magnitude of an electric field

The magnitude of an electric field between two separated plates can be calculated by the relation

- A. ΔV = Ed ✓ **Correct answer**
- B. ΔV = E/d
- C. ΔV = E qo
- D. E = d ΔV

A. correct: the potential difference between two plates a distance d apart in a uniform field E is ΔV = Ed.

B. wrong: the potential difference is E times d, not E divided by d.

C. wrong: E times the test charge is a force, not a potential difference.

D. wrong: this rearranges the relation incorrectly (E = ΔV/d).

Question 55 SI unit of electric flux is

SI unit of electric flux is

- A. NmC-1
- B. Nm-2C-2
- C. Nm2C-2 ✓ **Correct answer**
- D. Nm2C-2

A. wrong: N·m·C^-1 is the unit of electric field, not of flux.

B. wrong: this is not the unit of electric flux.

C. correct as keyed: the SI unit of electric flux is the newton square metre per coulomb (N·m^2·C^-1); note that options C and D print identically in the source, and the exponent is misprinted — the flux unit is N·m^2/C, and the key records C.

D. wrong as the answer: D prints identically to C in the source, but the key records C as the

Question 56 The equivalent current which passes from

The equivalent current which passes from a point at higher potential to a point at a lower potential as if it represented a movement of positive charges is

- A. Electronic current
- B. Electric current
- C. Magnetic lines
- D. Conventional current ✓ **Correct answer**

A. wrong: the electronic current is the flow of electrons (from lower to higher potential).

B. wrong: this is the general term; the specific name for the positive-charge convention is the conventional current.

C. wrong: magnetic lines have nothing to do with current direction.

D. correct: the conventional current is taken to flow from higher to lower potential, as if positive charges were moving.

Question 57 If V is applied potential difference

If ‘V’ is applied potential difference across a resistance ‘R’, then loss in potential energy per unit time is

- A. VI
- B. I2R
- C. V2 R
- D. All of the above ✓ **Correct answer**

A. correct as one form: the power loss is VI.

B. correct as one form: the power loss is I^2 R.

one form: the power loss is V^2/R (printed as 'V2 R' in the source).

D. correct: VI, I^2 R and V^2/R are all expressions for the same power loss, so all of the above are correct.

Question 58 The substances like germanium and silicon

The substances like germanium and silicon have

- A. Negative temperature coefficients ✓ **Correct answer**
- B. Positive temperature coefficients
- C. Both A and B
- D. None of the above

A. correct: germanium and silicon are semiconductors, whose resistance decreases as the temperature rises, so they have negative temperature coefficients of resistance.

B. wrong: conductors have positive coefficients; semiconductors have negative ones.

C. wrong: the coefficient is negative, not both.

D. wrong: the negative coefficient is the correct description.

Question 59 The sensitivity of a galvanometer can

The sensitivity of a galvanometer can be decreased by

- A. Increasing magnetic field
- B. Increasing number of turns of the coil
- C. Increasing c BAN Ration ✓ **Correct answer**
- D. Decreasing length of couple ‘c’

A. wrong: increasing B increases the sensitivity.

B. wrong: increasing N increases the sensitivity.

C. correct as keyed: the sensitivity of a galvanometer is NBA/c, so increasing the torsional

ne 'c' in the printed option, garbled in the source) decreases the sensitivity.

D. wrong: decreasing c would increase the sensitivity, not decrease it.

Question 60 Force on a current carrying conductor

Force on a current carrying conductor in a uniform magnetic field is

- A. F = NIA cos α
- B. F = μnI
- C. F = ILB sin α ✓ **Correct answer**
- D. F = ILA cos α

A. wrong: this is the torque on a coil, not the force on a conductor.

B. wrong: this is not the force on a current-carrying conductor.

C. correct: the force on a conductor of length L carrying current I in a field B is F = ILB sin α.

D. wrong: the force goes as sin α with the length L, not as cos α with the area A.

Question 61 In an electrochemical series standard electrode

In an electrochemical series, standard electrode potentials are arranged on the basis of:

- A. pH scale
- B. pOH scale
- C. Hydrogen Scale ✓ **Correct answer**
- D. pKa scale

A. wrong: the electrode potentials are not arranged on the pH scale.

B. wrong: the electrode potentials are not arranged on the pOH scale.

C. correct: the standard electrode potentials are arranged with reference to the standard hydrogen electrode (the hydrogen scale).

e electrode potentials are not arranged on the pKa scale.

Question 62 The reaction which is responsible for

The reaction which is responsible for the production of electricity in the Voltaic cell is:

- A. Hydrolysis reaction
- B. Oxidation reaction
- C. Redox reaction ✓ **Correct answer**
- D. Reduction reaction

A. wrong: hydrolysis does not produce electricity in the cell.

B. wrong: oxidation alone is only half of the cell reaction.

C. correct: the voltaic cell produces electricity by a redox reaction (oxidation at the anode, reduction at the cathode).

D. wrong: reduction alone is only half of the cell reaction.

Question 63 Glucose is converted into ethanol by

Glucose is converted into ethanol by the enzyme _____ present in yeast:

- A. Urease
- B. Invertase
- C. Sucrase
- D. Zymase ✓ **Correct answer**

A. wrong: urease hydrolyses urea, it does not ferment glucose.

B. wrong: invertase hydrolyses sucrose to glucose and fructose.

C. wrong: sucrase hydrolyses sucrose.

D. correct: the enzyme zymase in yeast converts glucose into ethanol (alcoholic fermentation).

64 The rate of reaction involving ions

The rate of reaction involving ions can be studied by _____ method

- A. Dilatometric
- B. Refractometric
- C. Optical rotation
- D. Electrical conductivity ✓ **Correct answer**

A. wrong: the dilatometric method follows volume changes, not ionic rates.

B. wrong: the refractometric method follows refractive index, not ionic rates.

C. wrong: the optical rotation method is used for optically active substances, not for ionic reactions in general.

D. correct: the rate of a reaction involving ions is followed by the electrical conductivity method (the conductivity changes as ions are consumed or produced).

Question 65 When one mole of gaseous hydrogen

When one mole of gaseous hydrogen ions are dissolved in water to form an infinitely dilute solution, the amount of heat liberated is

- A. -1891 kJmol-1
- B. -1075 kJmol-1 ✓ **Correct answer**
- C. -499 kJmol-1
- D. -1562 kJmol-1

A. wrong: this is not the hydration enthalpy of the hydrogen ion.

B. correct: the hydration enthalpy of one mole of gaseous hydrogen ions forming an infinitely dilute solution is −1075 kJ/mol (the textbook value).

C. wrong: this is not the hydration enthalpy of the hydrogen ion.

D. wrong: this is not the hydration enthalpy of the hydrogen ion.

66 Energy required to remove an electron

Energy required to remove an electron from the outermost shell of its isolated gaseous atom in the ground state is

- A. Electron affinity
- B. Lattice energy
- C. Ionization energy ✓ **Correct answer**
- D. Crystal energy

A. wrong: electron affinity is the energy released when an electron is added, not removed.

B. wrong: lattice energy is the energy of forming a crystal lattice from gaseous ions.

C. correct: the energy required to remove an electron from the outermost shell of an isolated gaseous atom in the ground state is the ionisation energy.

D. wrong: this is not the energy of removing an electron from a gaseous atom.

Question 67 Which of the following carbonates of

Which of the following carbonates of alkali metals is not stable towards heat and is decomposed on heating to its oxide along with liberation of CO2?

- A. Li2CO3 ✓ **Correct answer**
- B. Mg2CO3
- C. K2CO3
- D. Na2CO3

A. correct: lithium carbonate is the alkali-metal carbonate that is not stable to heat; it decomposes to Li2O and CO2 on heating (the small Li+ ion polarises the carbonate ion).

B. wrong: magnesium is not an alkali metal, and the question asks for an alkali-metal carbonate.

C. wrong: potassium carbonate is stable to heat.

dium carbonate is stable to heat.

Question 68 The presence of calcium is essential

The presence of calcium is essential for the normal development of plants. An adequate supply of calcium appears to stimulate the development of which part of the plants?

- A. Leaves
- B. Fruits
- C. Root hairs ✓ **Correct answer**
- D. Branches

A. wrong: calcium does not specifically stimulate leaf development.

B. wrong: calcium does not specifically stimulate fruit development.

C. correct: an adequate supply of calcium stimulates the development of root hairs (calcium is essential for cell-wall formation in the growing root tip).

D. wrong: calcium does not specifically stimulate branch development.

Question 69 Which of the following sulphates is

Which of the following sulphates is not soluble in water?

- A. Sodium Sulphate
- B. Barium Sulphate ✓ **Correct answer**
- C. Potassium Sulphate
- D. Zinc Sulphate

A. wrong: sodium sulphate is soluble in water.

B. correct: barium sulphate is insoluble in water (it is used as a white precipitate test for sulphate).

C. wrong: potassium sulphate is soluble in water.

nc sulphate is soluble in water.

Question 70 The trend in the densities of

The trend in the densities of elements of Group III-A of the Periodic Table is

- A. A gradual increase ✓ **Correct answer**
- B. A gradual decrease
- C. First decrease then increase
- D. First increase then decrease

A. correct: the densities of the Group III-A (Group 13) elements increase gradually down the group (B < Al < Ga < In < Tl) as the atomic mass rises faster than the atomic volume.

B. wrong: the densities increase, not decrease, down the group.

C. wrong: the trend is a steady increase.

D. wrong: the trend is a steady increase.

Question 71 White lead has one of the

White lead has one of the following properties

- A. Acidic
- B. Crystalline
- C. Amorphous ✓ **Correct answer**
- D. Neutral

A. wrong: white lead (basic lead carbonate) is not acidic.

B. wrong: white lead is amorphous, not crystalline.

C. correct: white lead is amorphous in form.

D. wrong: white lead is basic (it is basic lead carbonate), not neutral.

72 The strongest acid among the following

The strongest acid among the following is

- A. HF
- B. HI ✓ **Correct answer**
- C. HCl
- D. HBr

A. wrong: HF is the weakest acid of the hydrogen halides.

B. correct: the acid strength of the hydrogen halides increases down the group (HF < HCl < HBr < HI), so HI is the strongest.

C. wrong: HCl is weaker than HBr and HI.

D. wrong: HBr is weaker than HI.

Question 73 The noble gas which is used

The noble gas which is used in radiotherapy of cancer is

- A. Radon ✓ **Correct answer**
- B. Xenon
- C. Krypton
- D. Argon

A. correct: radon is the noble gas used in the radiotherapy of cancer (radon seeds/implants).

B. wrong: xenon is used in lamps and as an anaesthetic, not in cancer radiotherapy.

C. wrong: krypton is used in lamps, not in cancer radiotherapy.

D. wrong: argon is used in welding and lighting, not in cancer radiotherapy.

74 Paramagnetic behavior of an atom ion

Paramagnetic behavior of an atom, ion or molecule is due to presence of

- A. Unpaired electrons ✓ **Correct answer**
- B. Paired electrons
- C. Protons
- D. Neutrons

A. correct: paramagnetism arises from the presence of unpaired electrons (their magnetic moments do not cancel).

B. wrong: paired electrons give diamagnetism, not paramagnetism.

C. wrong: paramagnetism is due to unpaired electrons, not protons.

D. wrong: paramagnetism is due to unpaired electrons, not neutrons.

Question 75 The geometry of the complexes depends

The geometry of the complexes depends upon the type of _____ taking place in the valence shell of the central metal atom

- A. Hybridization ✓ **Correct answer**
- B. Protonation
- C. Deprotonation
- D. Dissociation

A. correct: the geometry of a complex depends on the type of hybridisation in the valence shell of the central metal atom.

B. wrong: protonation does not determine the geometry of a complex.

C. wrong: deprotonation does not determine the geometry of a complex.

D. wrong: dissociation does not determine the geometry of a complex.

76 KMnO4 acts as a

KMnO4 acts as a

- A. Reducing agent
- B. Excellent precipitating reagent
- C. Germicide
- D. Oxidizing agent ✓ **Correct answer**

A. wrong: KMnO4 is an oxidising agent, not a reducing agent.

B. wrong: KMnO4 is not used as a precipitating reagent.

C. wrong: KMnO4 is not classified as a germicide.

D. correct: potassium permanganate is a strong oxidising agent (Mn(VII) is reduced to Mn(II) in acid).

Question 77 A gasoline of higher octane number

A gasoline of higher octane number can be obtained by

- A. Oxidative cleavage
- B. Thermal cracking
- C. Catalytic cracking ✓ **Correct answer**
- D. Steam cracking

A. wrong: oxidative cleavage breaks molecules apart; it does not raise the octane number.

B. wrong: thermal cracking gives mainly straight-chain products of lower octane.

C. correct: catalytic cracking produces branched-chain hydrocarbons, which have higher octane numbers.

D. wrong: steam cracking produces mainly alkenes (ethylene), not high-octane gasoline.

78 Ethyne molecule is formed when two

Ethyne molecule is formed when two carbon atoms joined together to form a sigma bond by

- A. sp-s overlap
- B. sp3-sp3 overlap
- C. 2py-2py overlap
- D. sp-sp overlap ✓ **Correct answer**

A. wrong: sp-s overlap would involve a hydrogen s orbital, not two carbons.

B. wrong: sp3-sp3 overlap gives a single bond in ethane, not the triple bond of ethyne.

C. wrong: 2py-2py overlap forms a pi bond, not the sigma bond.

D. correct: the C–C sigma bond in ethyne is formed by the overlap of two sp hybrid orbitals, one from each carbon.

Question 79 Symmetrical alkanes can be produced by

Symmetrical alkanes can be produced by

- A. Sabatier Sender's Reaction
- B. Hydrogenolysis Reaction
- C. Reduction Reaction
- D. Kolbe's Electrolytic Reaction ✓ **Correct answer**

A. wrong: the Sabatier–Senderens reaction reduces alkenes/alkynes to alkanes; it does not specifically give symmetrical alkanes.

B. wrong: hydrogenolysis cleaves bonds with hydrogen; it does not build symmetrical alkanes.

C. wrong: reduction in general does not specifically produce symmetrical alkanes.

D. correct: Kolbe's electrolysis of a carboxylate salt couples two identical alkyl radicals to

etrical alkane (R–R).

Question 80 The catalyst used for the preparation

The catalyst used for the preparation of acrylonitrile is

- A. Cu_2Cl_2 and NH_4Cl ✓ **Correct answer**
- B. Al_2O_3 and NH_4Cl
- C. Cu_2Cl_2 and NH_4OH
- D. Cu_2Cl_2 and Al_2O_3

A. correct: the catalyst used for the preparation of acrylonitrile is cuprous chloride with ammonium chloride.

B. wrong: alumina is not part of the acrylonitrile catalyst.

C. wrong: the co-catalyst is ammonium chloride, not ammonium hydroxide.

D. wrong: alumina is not part of the acrylonitrile catalyst.

Question 81 When a hydrogen atom is removed

When a hydrogen atom is removed from benzene, the group left behind is called

- A. Alkyl group
- B. Phenyl group ✓ **Correct answer**
- C. Benzyl group
- D. Methyl group

A. wrong: an alkyl group comes from an alkane, not from benzene.

B. correct: removing one hydrogen atom from benzene leaves the phenyl group (C_6H_5–).

C. wrong: the benzyl group ($C_6H_5CH_2$–) comes from toluene, not from benzene.

D. wrong: the methyl group (CH_3–) comes from methane.

82 The introduction of NO2 group in

The introduction of NO2 group in benzene ring is called ‘Nitration’. The nitration of benzene takes place when it is heated with a 1:1 mixture of _____ at 50 oC-55 oC.

- A. Conc. HNO3 and conc. HCl
- B. Conc. HNO3 and conc. Acetic acid
- C. Conc. HNO3 and H3PO4
- D. Conc. HNO3 and conc. H2SO4 ✓ **Correct answer**

A. wrong: hydrochloric acid is not used for nitration.

B. wrong: acetic acid is not used for nitration.

C. wrong: phosphoric acid is not used for nitration.

D. correct: nitration of benzene uses a 1:1 mixture of concentrated nitric acid and concentrated sulphuric acid at 50–55 °C.

Question 83 During SN2 reactions configuration of the

During SN2 reactions, configuration of the alkyl halide molecule:

- A. Gets inverted ✓ **Correct answer**
- B. Remains same
- C. Depends upon the carbon atom
- D. Depends upon the electronegativity of halide

A. correct: in an SN2 reaction the nucleophile attacks from the back, so the configuration of the alkyl halide is inverted (Walden inversion).

B. wrong: the configuration is inverted, not retained.

C. wrong: inversion is the general outcome of SN2, regardless of the carbon atom.

D. wrong: inversion does not depend on the electronegativity of the halide.

84 Grignard reagents are prepared by the

Grignard reagents are prepared by the reaction of magnesium metal with alkyl halides in the presence of

- A. Dry Ether ✓ **Correct answer**
- B. Sodium Lead Alloy
- C. Alcohol
- D. Water

A. correct: Grignard reagents are prepared from magnesium and an alkyl halide in dry ether (water or alcohol would destroy the reagent).

B. wrong: a sodium–lead alloy is not used for Grignard reagents.

C. wrong: alcohol reacts with and destroys the Grignard reagent.

D. wrong: water reacts with and destroys the Grignard reagent.

Question 85 Methanol is prepared from carbon monoxide

Methanol is prepared from carbon monoxide and hydrogen. The catalyst used for this reaction is

- A. ZnO + CoO2
- B. ZnO + CuO
- C. ZnO + Ag2O
- D. Cr2O3 + ZnO ✓ **Correct answer**

A. wrong: cobalt oxide is not part of the methanol catalyst.

B. wrong: copper oxide is not the co-catalyst in the textbook methanol preparation.

C. wrong: silver oxide is not part of the methanol catalyst.

D. correct: methanol is prepared from carbon monoxide and hydrogen using a chromium(III) oxide and zinc oxide catalyst.

86 Ethanol reacts with Ammonia to produce

Ethanol reacts with Ammonia to produce ethyl amine, the catalyst is

- A. ZnCl2
- B. ThO2 ✓ **Correct answer**
- C. C6H5N
- D. Cr2O3

A. wrong: zinc chloride is not the catalyst for this amination.

B. correct: ethanol reacts with ammonia to give ethylamine in the presence of thorium dioxide (ThO2) as catalyst.

C. wrong: this is not a catalyst for the reaction.

D. wrong: chromium(III) oxide is not the catalyst for this amination.

Question 87 Dissociation constant of phenol is

Dissociation constant of phenol is

- A. 1.2 x 10^-10
- B. 1.2 × 10^10
- C. 1.3 × 10^10
- D. 1.3 x 10^-10 ✓ **Correct answer**

A. wrong: the value is 1.3 × 10^-10, not 1.2 × 10^-10.

B. wrong: the dissociation constant is of the order of 10^-10, not 10^10.

C. wrong: the dissociation constant is of the order of 10^-10, not 10^10.

D. correct: the dissociation constant (Ka) of phenol is 1.3 × 10^-10.

88 Dry distillation of a mixture of

Dry distillation of a mixture of calcium salts of formic acid and acetic acid results into the formation of

- A. Formaldehyde
- B. Acetaldehyde ✓ **Correct answer**
- C. Calcium acetate
- D. Sodium acetate

A. wrong: formaldehyde comes from the dry distillation of calcium formate alone.

B. correct: dry distillation of a mixture of calcium formate and calcium acetate gives acetaldehyde.

C. wrong: calcium acetate is a reactant, not the product.

D. wrong: sodium acetate is not involved in this distillation.

Question 89 Hydrolysis of cyano group by an

Hydrolysis of cyano group by an aqueous acid results into

- A. Carboxylic Acid ✓ **Correct answer**
- B. Acid Amide
- C. Cyanohydride
- D. Formaldehyde

A. correct: hydrolysis of the cyano group (–CN) by aqueous acid gives a carboxylic acid.

B. wrong: the amide is only an intermediate; complete hydrolysis by aqueous acid gives the carboxylic acid.

C. wrong: a cyanohydrin is a different compound (an addition product of HCN to a carbonyl).

D. wrong: formaldehyde is not the hydrolysis product of a cyano group.

90 Brick red precipitates are formed when

Brick red precipitates are formed when aldehydes react with

- A. Sodium borohydride
- B. Sodium bisulphite
- C. Sodium nitroprusside
- D. Fehling’s solution ✓ **Correct answer**

A. wrong: sodium borohydride reduces aldehydes to alcohols; it gives no brick-red precipitate.

B. wrong: sodium bisulphite forms a white addition compound with aldehydes, not a brick-red precipitate.

C. wrong: sodium nitroprusside gives a red colour with ketones in the presence of alkali, not a brick-red precipitate with aldehydes.

D. correct: aldehydes reduce Fehling’s solution to brick-red cuprous oxide (Cu2O).

Question 91 The nature of the amino acid

The nature of the amino acid ‘lysine’ is

- A. Neutral
- B. Acidic
- C. Amphoteric
- D. Basic ✓ **Correct answer**

A. wrong: lysine has two amino groups and is basic, not neutral.

B. wrong: lysine is basic, not acidic.

C. wrong: lysine is classified as basic (it has an extra amino group).

D. correct: lysine is a basic amino acid (it carries two amino groups and one carboxyl group).

92 Which of the following compounds in

Which of the following compounds, in the form of aqueous solution, on reaction with sodium carbonate will produce carbon dioxide gas?

- A. H3C-COO-C2H5
- B. H3C2-COO-CH3
- C. H3C2-CO-OH ✓ **Correct answer**
- D. H3C2-COO-C2H5

A. wrong: this is an ester (ethyl acetate); esters do not liberate CO2 from sodium carbonate.

B. wrong: this is an ester (methyl propanoate); esters do not liberate CO2 from sodium carbonate.

C. correct: this is propanoic acid, a carboxylic acid, and carboxylic acids react with sodium carbonate to liberate carbon dioxide.

D. wrong: this is an ester (ethyl propanoate); esters do not liberate CO2 from sodium carbonate.

Question 93 Collagen and albumin are

Collagen and albumin are

- A. Simple proteins ✓ **Correct answer**
- B. Derived proteins
- C. Polyamides
- D. Polysaccharides

A. correct: collagen and albumin are simple proteins (they yield only amino acids on hydrolysis).

B. wrong: derived proteins are products of protein hydrolysis or denaturation, not collagen and albumin.

lyamides are synthetic polymers (nylon), not these proteins.

D. wrong: polysaccharides are carbohydrates, not proteins.

Question 94 Urea is produced by the reaction

Urea is produced by the reaction of liquid ammonia with

- A. CO2 ✓ **Correct answer**
- B. CO
- C. CaO
- D. C

A. correct: urea is produced industrially by the reaction of liquid ammonia with carbon dioxide.

B. wrong: urea is made from CO2, not CO.

C. wrong: calcium oxide is not used to make urea.

D. wrong: carbon is not used to make urea.

Question 95 The calcium sulpho-aluminate is

The calcium sulpho-aluminate is

- A. Co.Al2O3.3CaSO4.6H2O
- B. 3Ca.Al2O3.CaSO4.2H2O
- C. 3Ca.Al2O3.3CaSO4.2H2O ✓ **Correct answer**
- D. 3Ca.Al2O3.3CaSO4.6H2O

A. wrong: this formula (with 6H2O and the misprinted 'Co') is not the textbook composition.

B. wrong: the sulphate count is 3, not 1.

C. correct: calcium sulpho-aluminate in cement is $3CaO{\cdot}Al_2O_3{\cdot}3CaSO_4{\cdot}2H_2O$ (written in

's shorthand as 3Ca.Al2O3.3CaSO4.2H2O).

D. wrong: the water count is 2, not 6.

Question 96 The coagulant used in raw water

The coagulant used in raw water to precipitate suspended impurities is

- A. Caustic soda
- B. Lime water
- C. Alum ✓ **Correct answer**
- D. Soda ash

A. wrong: caustic soda is not the coagulant used to precipitate suspended impurities.

B. wrong: lime water is used for softening, not as the coagulant for suspended impurities.

C. correct: alum is the coagulant used in raw water to precipitate suspended impurities.

D. wrong: soda ash is used for softening water, not as the coagulant for suspended impurities.

Question 97 The whiteness of the recycled newspaper

The whiteness of the recycled newspaper is improved by treating it with:

- A. Sodium hydroxide
- B. Per oxides ✓ **Correct answer**
- C. Super oxides
- D. Normal oxides

A. wrong: sodium hydroxide alone does not improve the whiteness of recycled newspaper.

B. correct: the whiteness of recycled newspaper is improved by treating it with peroxides (bleaching agents).

peroxides are not used to bleach recycled newspaper.

D. wrong: normal oxides are not used to bleach recycled newspaper.

Question 98 One mole of any gas at

One mole of any gas at standard temperature and pressure (STP) occupies a volume of

- A. 20.414 dm3
- B. 22.414 dm3 ✓ **Correct answer**
- C. 22.414 cm3
- D. 23.414 dm3

A. wrong: the molar volume at STP is 22.414 dm^3, not 20.414 dm^3.

B. correct: one mole of any gas at STP occupies 22.414 dm^3.

C. wrong: the volume is 22.414 dm^3 (litres), not cm^3.

D. wrong: the molar volume at STP is 22.414 dm^3, not 23.414 dm^3.

Question 99 The relative abundance of the isotopes

The relative abundance of the isotopes of the elements can be determined by:

- A. Mass Spectrometry ✓ **Correct answer**
- B. X-rays
- C. Chromatography
- D. Solvent Extraction

A. correct: the relative abundance of the isotopes of an element is determined by mass spectrometry.

B. wrong: X-rays do not determine isotopic abundance.

C. wrong: chromatography separates mixtures; it does not determine isotopic abundance.

lvent extraction separates substances; it does not determine isotopic abundance.

Question 100 If we are given the mass

If we are given the mass of one substance, we can calculate volume of other substances and vice a versa with the help of balanced chemical equation. This is called

- A. Mass-mass relationship
- B. Mass-mole relationship
- C. Mole-volume relationship
- D. Mass-volume relationship ✓ **Correct answer**

A. wrong: a mass-mass relationship relates the masses of two substances, not a mass and a volume.

B. wrong: a mass-mole relationship relates mass and moles, not mass and volume.

C. wrong: a mole-volume relationship relates moles and volume, not mass and volume.

D. correct: calculating the volume of one substance from the mass of another (and vice versa) by a balanced equation is the mass-volume relationship.

Question 101 Sublimation is used to purify

Sublimation is used to purify

- A. Ammonium sulphate
- B. Sodium chloride
- C. Benzoic acid ✓ **Correct answer**
- D. Lead carbonate

A. wrong: ammonium sulphate does not sublime.

B. wrong: sodium chloride does not sublime.

enzoic acid sublimes on heating and is purified by sublimation.

D. wrong: lead carbonate does not sublime.

Question 102 The purity of a substance can

The purity of a substance can be identified by

- A. Sublimation
- B. Filtration
- C. Chromatography ✓ **Correct answer**
- D. Solvent extraction

A. wrong: sublimation purifies a substance; it does not identify its purity.

B. wrong: filtration separates solids from liquids; it does not identify purity.

C. correct: the purity of a substance can be identified by chromatography (a pure substance gives a single spot/band).

D. wrong: solvent extraction separates substances; it does not identify purity.

Question 103 Which one of the following mathematical

Which one of the following mathematical expressions represents the Avogadro’s law?

- A. V= R nT P (when ‘T’ and ‘n’ are constant)
- B. V= R nT P (when ‘P’, ‘T’ and ‘n’ are constant)
- C. V= R P nT (when ‘P’ and ‘n’ are constant)
- D. V= R nT P (when ‘P’ and ‘T’ are constant) ✓ **Correct answer**

A. wrong: with T and n constant, V is constant at constant P — this is not Avogadro's law.

B. wrong: with P, T and n all constant, V cannot vary at all.

C. wrong: with P and n constant, V varies with T — this is Charles's law, not Avogadro's law.

with P and T constant, V = (RT/P)n, so the volume is directly proportional to the number of moles — Avogadro's law.

Question 104 The root mean square velocity of

The root mean square velocity of gases is inversely proportional to the square root of their:

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

A. correct: the root mean square velocity u = √(3RT/M) is inversely proportional to the square root of the molar mass.

B. wrong: the rms velocity is directly proportional to the square root of the temperature, not inversely.

C. wrong: the rms velocity does not depend on the pressure.

D. wrong: the rms velocity does not depend on the volume.

Question 105 Plasma is the ionized gas mixture

Plasma is the ionized gas mixture which consists of

- A. Ions and electrons
- B. Electrons and neutral atoms
- C. Electrons, ions and neutral atoms ✓ **Correct answer**
- D. Ions and neutral atoms

A. wrong: a plasma also contains neutral atoms, not only ions and electrons.

B. wrong: a plasma also contains ions.

Plasma is an ionised gas mixture consisting of electrons, ions and neutral atoms.

D. wrong: a plasma also contains free electrons.

Question 106 Which type of force is present

Which type of force is present in gasoline?

- A. Dipole-dipole forces
- B. Dipole-induced dipole forces
- C. London dispersion forces ✓ **Correct answer**
- D. hydrogen bonding

A. wrong: gasoline consists of non-polar hydrocarbons, which have no permanent dipoles.

B. wrong: gasoline is non-polar, so dipole-induced dipole forces are not its main forces.

C. correct: gasoline is a mixture of non-polar hydrocarbons, so the forces between its molecules are London dispersion forces.

D. wrong: gasoline contains no O–H or N–H groups, so there is no hydrogen bonding.

Question 107 In the structure of NaCl each

In the structure of NaCl, each Na+ is surrounded by _____ Cl- ions.

- A. Four
- B. Eight
- C. Five
- D. Six ✓ **Correct answer**

A. wrong: each Na+ is surrounded by six Cl− ions, not four.

B. wrong: each Na+ is surrounded by six Cl− ions, not eight.

C. wrong: each Na+ is surrounded by six Cl− ions, not five.

the NaCl structure each Na^+ ion is octahedrally surrounded by six Cl^- ions.

Question 108 The charge of one gram of

The charge of one gram of electron is

- A. 1.7588 x 10^-11
- B. 1.7588 × 10^11
- C. 1.602 x 10^-19
- D. 1.7588 × 10^8 ✓ **Correct answer**

A. wrong: the charge of one gram of electrons is 1.7588 × 10^8 C, not 10^-11.

B. wrong: 1.7588 × 10^11 C/kg is the specific charge per kilogram, not per gram.

C. wrong: 1.602 × 10^-19 C is the charge of a single electron, not of one gram of electrons.

D. correct: the specific charge of an electron is 1.7588 × 10^11 C/kg, so one gram (10^-3 kg) of electrons carries 1.7588 × 10^8 C.

Question 109 The ionization energy of hydrogen atom

The ionization energy of hydrogen atom is

- A. Zero
- B. 13.13 kJmol-1
- C. 1313.31 kJmol-1 ✓ **Correct answer**
- D. 1313.31 k2Jmol

A. wrong: the ionisation energy of hydrogen is not zero.

B. wrong: the value is 1313.31 kJ/mol, not 13.13 kJ/mol.

C. correct: the ionisation energy of the hydrogen atom is 1313.31 kJ/mol (13.6 eV per atom).

D. wrong: this is a misprint of the unit and is not the ionisation energy.

110 Which quantum number helps to study

Which quantum number helps to study the orientation of an orbital in space?

- A. Principal Quantum Number
- B. Spin Quantum Number
- C. Magnetic Quantum Number ✓ **Correct answer**
- D. Azimuthal Quantum Number

A. wrong: the principal quantum number gives the energy and size of the orbital, not its orientation.

B. wrong: the spin quantum number gives the spin of the electron, not the orientation of the orbital.

C. correct: the magnetic quantum number (m) determines the orientation of an orbital in space.

D. wrong: the azimuthal quantum number gives the shape (subshell) of the orbital, not its orientation.

Question 111 The inter-ionic distance in a crystal

The inter-ionic distance in a crystal lattice of KCl is

- A. 314 pm ✓ **Correct answer**
- B. 181 pm
- C. 95 pm
- D. 300 pm

A. correct: the inter-ionic distance in KCl is the sum of the ionic radii, r(K+) + r(Cl−) = 133 pm + 181 pm = 314 pm.

B. wrong: 181 pm is the radius of the chloride ion alone, not the inter-ionic distance.

C. wrong: this is not the inter-ionic distance in KCl.

e inter-ionic distance is 314 pm, not 300 pm.

Question 112 The number of bonds in nitrogen

The number of bonds in nitrogen molecule is

- A. One σ and two π
- B. Three σ only
- C. Two σ and one π

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 keyed answer is A: the nitrogen molecule N≡N has one sigma and two pi bonds.

B. wrong: N2 has only one sigma bond, not three.

C. wrong: N2 has one sigma and two pi bonds, not two sigma and one pi. (DEFECTIVE-excluded: option D is absent from the source, so the question cannot be served complete; the keyed answer A is recorded here. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 113 Which one of the following molecules

Which one of the following molecules has zero dipole moment?

- A. NH3
- B. CHCl3
- C. BF3 ✓ **Correct answer**
- D. H2O

A. wrong: ammonia has a dipole moment (its pyramidal shape is unsymmetrical).

B. wrong: chloroform has a dipole moment (the C–Cl and C–H bond moments do not cancel).

BF_3 is trigonal planar and symmetrical, so its bond dipoles cancel and its dipole moment is zero.

D. wrong: water has a dipole moment (its bent shape is unsymmetrical).

Question 114 A spontaneous process is

A spontaneous process is

- A. Unidirectional and irreversible
- B. Irreversible and a real process
- C. Unidirectional and a real process
- D. All of the above ✓ **Correct answer**

A. correct as one description: a spontaneous process is unidirectional and irreversible.

B. correct as one description: a spontaneous process is irreversible and a real process.

C. correct as one description: a spontaneous process is unidirectional and a real process.

D. correct: a spontaneous process is unidirectional, irreversible and a real process, so all of the above are correct.

Question 115 The standard enthalpy of solution of

The standard enthalpy of solution of NH_4Cl is _____ kJmol-1.

- A. +16.2 ✓ **Correct answer**
- B. -25.0
- C. +4.98
- D. +26.0

A. correct: the standard enthalpy of solution of ammonium chloride is +16.2 kJ/mol (dissolution is endothermic).

B. wrong: the enthalpy of solution of NH_4Cl is +16.2 kJ/mol, not −25.0 kJ/mol.

e enthalpy of solution of NH4Cl is +16.2 kJ/mol, not +4.98 kJ/mol.

D. wrong: the enthalpy of solution of NH4Cl is +16.2 kJ/mol, not +26.0 kJ/mol.

Question 116 The Kc has following units for

The Kc has following units for the reaction H2(g) + I2(g) ⇋ 2HI (g)

- A. mol3dm-6
- B. moldm-3
- C. mol-3dm6
- D. No unit ✓ **Correct answer**

A. wrong: for H2 + I2 ⇌ 2HI the number of moles is the same on both sides, so Kc has no units.

B. wrong: Kc has no units for this reaction.

C. wrong: Kc has no units for this reaction.

D. correct: Kc = [HI]^2/([H2][I2]); the concentration units cancel (Δn = 0), so Kc is dimensionless.

Question 117 01 mole of acetic acid has

0.1 mole of acetic acid has been dissolved per dm3 of the solution, the percentage ionization of acetic acid will be

- A. 13
- B. 15
- C. 1.3 ✓ **Correct answer**
- D. 0.1

A. wrong: the percentage ionisation is 1.3%, not 13%.

B. wrong: the percentage ionisation is 1.3%, not 15%.

r 0.1 M acetic acid (Ka = 1.8 × 10^-5), α = √(Ka/C) = √(1.8 × 10^-4) = 0.0134, i.e. 1.3% ionisation.

D. wrong: the percentage ionisation is 1.3%, not 0.1%.

Question 118 Solubility of Ce2SO43

Solubility of Ce2(SO4)3

- A. Increases with temperature
- B. Decreases with temperature
- C. Shows exceptional behavior ✓ **Correct answer**
- D. Remains constant

A. wrong: the solubility of Ce2(SO4)3 does not increase with temperature.

B. correct in fact: the solubility of Ce2(SO4)3 decreases with rising temperature, which is the exceptional behaviour itself; it is a second correct option.

C. correct: the solubility of cerium(III) sulphate shows exceptional behaviour — it decreases with increasing temperature, unlike most salts — and this is the answer the key records.

D. wrong: the solubility of Ce2(SO4)3 changes with temperature. (PICK-ONE: both B and C are correct — the solubility decreases with temperature, which is the exceptional behaviour. The key records C, which is filed. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 119 Seawater has 565 x 10-3 g

Seawater has 5.65 x 10^-3 g of dissolved oxygen in one kilogram of water. Concentration of O2 in parts per million is

- A. 5.65 ✓ **Correct answer**
- B. 7.69

- D. 4.11

A. correct: 5.65 × 10^-3 g of O2 per kg of water = 5.65 mg per kg = 5.65 parts per million.

B. wrong: the concentration is 5.65 ppm, not 7.69 ppm.

C. wrong: the concentration is 5.65 ppm, not 5.20 ppm.

D. wrong: the concentration is 5.65 ppm, not 4.11 ppm.

Question 120 Metallic conduction involves the relatively free

Metallic conduction involves the relatively free movement of their _____ throughout the metallic lattice

- A. Atoms
- B. Molecules
- C. Electrons ✓ **Correct answer**
- D. Ions

A. wrong: metallic conduction is not due to the movement of atoms.

B. wrong: metallic conduction is not due to the movement of molecules.

C. correct: metallic conduction involves the relatively free movement of electrons throughout the metallic lattice.

D. wrong: the ions in a metal are fixed in the lattice; conduction is by electrons.

Question 121 My advice had no on him

My advice had no _____ on him.

- A. Effect ✓ **Correct answer**
- B. Affect
- C. Influence

A. correct: 'effect' is the noun meaning result — 'my advice had no effect on him'.

B. wrong: 'affect' is a verb, not the noun needed here.

C. wrong: 'influence' does not fit the idiom 'had no effect on him'.

D. wrong: 'impression' does not fit the idiom 'had no effect on him'.

Question 122 Do not lose heart it is

Do not lose heart, it is just a _____ in the tea cup

- A. Wind
- B. Cyclone
- C. Blast
- D. Storm ✓ **Correct answer**

A. wrong: the idiom is 'a storm in a tea cup', not 'a wind in a tea cup'.

B. wrong: the idiom is 'a storm in a tea cup', not 'a cyclone in a tea cup'.

C. wrong: the idiom is 'a storm in a tea cup', not 'a blast in a tea cup'.

D. correct: the idiom is 'a storm in a tea cup' (a great fuss over a trivial matter).

Question 123 Pakistan from voting against Iran in

Pakistan _____ from voting against Iran in the United Nations

- A. Prevented
- B. Detained
- C. Abstained ✓ **Correct answer**
- D. Refused

A. wrong: 'prevented from voting' would mean Pakistan stopped someone else from

B. wrong: 'detained' means held in custody, which does not fit voting.

C. correct: 'abstained from voting' means Pakistan chose not to vote.

D. wrong: 'refused from voting' is not the correct collocation; the verb is 'abstained'.

Question 124 Please the door after you

Please _____ the door after you.

- A. Close
- B. Shut ✓ **Correct answer**
- C. Leave
- D. Knock

A. wrong: although 'close the door' is grammatical, the idiomatic instruction in this paper is 'shut the door'.

B. correct: 'please shut the door after you' is the idiomatic phrasing.

C. wrong: 'leave the door' does not complete the instruction.

D. wrong: 'knock the door' does not fit the instruction to close it after you.

Question 125 Suddenly he stopped at the edge

Suddenly he stopped at the edge of the meadow, taking his pocket knife from his pocket, and cut a wisp of alfalfa. [Choose the incorrect underlined part.]

- A. Suddenly he stopped
- B. taking his pocket knife ✓ **Correct answer**
- C. his pocket
- D. a wisp of alfalfa

A. correct: this segment is grammatically correct.

the error: the sentence is in the past tense ('stopped', 'cut'), so the participle 'taking' is wrong — it should be the past-tense verb 'took'.

C. correct: this segment is grammatically correct.

D. correct: this segment is grammatically correct.

Question 126 The study of population growth indicates

The study of population growth indicates one of the greatest paradox of our time. [Choose the incorrect underlined part.]

- A. The study
- B. population growth
- C. one of the
- D. paradox ✓ **Correct answer**

A. correct: this segment is grammatically correct.

B. correct: this segment is grammatically correct.

C. correct: this segment is grammatically correct.

D. correct as the error: after 'one of the greatest' the noun must be plural — 'one of the greatest paradoxes', not 'paradox'.

Question 127 Among the Western nations the decline

Among the Western nations, the decline in the death rate is followed after an interval by the reduction in the birth rate, so that the population is not now growing so fast. [Choose the incorrect underlined part.]

- A. Among
- B. death rate is followed
- C. reduction in the birth ✓ **Correct answer**
- D. is not now growing

is segment is grammatically correct.

B. correct: this segment is grammatically correct.

C. correct as the error: the phrase is incomplete — it should be 'the reduction in the birth rate' (the word 'rate' is missing after 'birth').

D. correct: this segment is grammatically correct.

Question 128 In view of increasing hazards with

In view of increasing hazards with our national security it is the duty of every citizen to keep a watch on his surroundings. [Choose the incorrect underlined part.]

- A. with ✓ **Correct answer**
- B. it is
- C. to keep
- D. on his surroundings

A. correct as the error: the correct preposition is 'to' — 'hazards to our national security', not 'hazards with our national security'.

B. correct: this segment is grammatically correct.

C. correct: this segment is grammatically correct.

D. correct: this segment is grammatically correct.

Question 129 Thrifty housewives preserved their homegrown vegetables

Thrifty housewives preserved their homegrown vegetables and fruits in canning, pickling or drying them for use during the cold weather. [Choose the incorrect underlined part.]

- A. in ✓ **Correct answer**
- B. or

- D. the

A. correct as the error: the correct preposition is 'by' — vegetables are preserved 'by canning, pickling or drying', not 'in canning, pickling or drying'.

B. correct: this segment is grammatically correct.

C. correct: this segment is grammatically correct.

D. correct: this segment is grammatically correct.

Question 130 When a low-wage category worker finds

When a low-wage category worker finds he has to maintain a large family, his expenses may exceeds his income. [Choose the incorrect underlined part.]

- A. When a low-wage
- B. worker finds
- C. maintain a large family
- D. exceeds his income ✓ **Correct answer**

A. correct: this segment is grammatically correct.

B. correct: this segment is grammatically correct.

C. correct: this segment is grammatically correct.

D. correct as the error: after the modal 'may' the verb must be in the base form — 'may exceed his income', not 'may exceeds his income'.

Question 131 Choose the correct option

Choose the correct option:

- A. This is different to what had been expected
- B. This is different what had been expected

- s is different from what had been expected ✓ **Correct answer**
- D. This is different to what would be expected

A. wrong: 'different to' is not the standard idiom (and the tense is also off).

B. wrong: the preposition 'from' is missing.

C. correct: 'different from' is the correct idiom, and the past perfect matches the context.

D. wrong: 'different to' is not the standard idiom.

Question 132 Choose the correct option

Choose the correct option:

- A. He suddenly remembered that he has left his house unlocked
- B. He suddenly remembered that he may have left his house unlocked
- C. He suddenly remembered that he had left his house unlocked ✓ **Correct answer**
- D. He suddenly remembered that he will have left his house unlocked

A. wrong: the present perfect 'has left' does not follow the past-tense 'remembered'.

B. wrong: 'may have left' expresses possibility, not the fact he remembered.

C. correct: the past perfect 'had left' is required after the past-tense 'remembered'.

D. wrong: the future perfect does not follow the past-tense 'remembered'.

Question 133 Choose the correct option

Choose the correct option:

- A. He asked us would we care to go
- B. He asked us if we would care to go ✓ **Correct answer**
- C. He asked us we would care to go
- D. He asked us we will care to go.

indirect question needs the conjunction 'if' (or 'whether').

B. correct: the indirect question is correctly formed with 'if' and the past-tense 'would'.

C. wrong: the conjunction 'if' is missing.

D. wrong: the conjunction is missing and 'will' should be 'would' in reported speech.

Question 134 Choose the correct option

Choose the correct option:

- A. When this war is over, no nation will either be isolated in war or peace
- B. When this war is over, no nation will be either isolated in war or peace
- C. When this war is over, no nation will neither be isolated in war nor peace
- D. When this war is over, no nation will be isolated either in war or in peace ✓ **Correct answer**

A. wrong: 'either' is misplaced (it should come before 'in war').

B. wrong: 'either' is misplaced (it should come before 'in war', and 'in peace' needs its own 'in').

C. wrong: 'neither...nor' cannot follow 'will' with 'no nation' in this construction.

D. correct: 'either...or' is correctly placed before the two parallel phrases 'in war' and 'in peace'.

Question 135 Choose the correct option

Choose the correct option:

- A. When the fact failed him, he questions his senses
- B. When the fact failed him, he questioned from his senses
- C. When the fact fails him, he questions his senses ✓ **Correct answer**
- D. He will question his senses, when the fact will fail him

e tenses do not agree ('failed' is past, 'questions' is present).

B. wrong: 'questioned from' is not idiomatic, and the tenses are inconsistent.

C. correct: both verbs are in the present tense, which agrees.

D. wrong: 'will' should not be used in the 'when' clause.

Question 136 Choose the correct option

Choose the correct option:

- A. He said there has been no need to do it
- B. He said there wasn't no need to do it
- C. He said there had been not any need doing it
- D. He said there was no need to do it ✓ **Correct answer**

A. wrong: the present perfect 'has been' does not follow the past-tense reporting verb 'said'.

B. wrong: this is a double negative.

C. wrong: the construction is awkward and ungrammatical.

D. correct: the past tense 'was' correctly follows the reporting verb 'said'.

Question 137 Choose the correct option

Choose the correct option:

- A. I could barely make of the traffic sings through the rain
- B. I could barely make out the traffic signs because of the rain ✓ **Correct answer**
- C. I could barely make up the traffic sings through the rain
- D. I could barely make with the traffic signs through the rain

A. wrong: 'make of' is not the phrasal verb, and 'sings' is a misspelling of 'signs'.

make out' means to discern, 'signs' is spelled correctly, and 'because of' is the right conjunction.

C. wrong: 'make up' means to invent, and 'sings' is a misspelling of 'signs'.

D. wrong: 'make with' is not the phrasal verb for discerning.

Question 138 Choose the correct option

Choose the correct option:

- A. He walked as though he is lame
- B. He walked as though he was lame ✓ **Correct answer**
- C. He walked as though he were lame
- D. He walked as though he may have been lame

A. wrong: the present tense 'is' does not follow 'as though' in this past-tense context.

B. correct: 'was' after 'as though' is accepted in modern English, and this is the answer the key records.

C. correct in formal grammar: 'were' is the past subjunctive after 'as though', so this is a second correct option.

D. wrong: 'may have been' does not fit the 'as though' construction. (PICK-ONE: both B and C are acceptable — 'was' in modern usage and 'were' in the formal subjunctive. The key records B, which is filed. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 139 Choose the correct option

Choose the correct option:

- A. E-mail is a relatively new means of communication ✓ **Correct answer**
- B. E-mail is a relatively new mean of communication
- C. E-mail is a relatively new mean to communication

all is a relatively new means to communication

A. correct: 'means' is the correct noun (singular in form) and 'of communication' is the right prepositional phrase.

B. wrong: 'mean' is not the noun for a method; the noun is 'means'.

C. wrong: 'mean' is not the noun, and 'to' is the wrong preposition.

D. wrong: the preposition should be 'of', not 'to'.

Question 140 Choose the correct option

Choose the correct option:

- A. The remain of the body was thrown into the sea
- B. The remains of the body were thrown into the sea ✓ **Correct answer**
- C. The remains of the body were thrown to the sea
- D. The remains of the body was thrown into the sea

A. wrong: the noun is 'remains' (plural), not 'remain'.

B. correct: 'remains' is plural, so it takes 'were', and 'into the sea' is the right preposition.

C. wrong: the preposition should be 'into', not 'to'.

D. wrong: 'remains' is plural, so the verb must be 'were', not 'was'.

Question 141 WALLOW

WALLOW

- A. Roll about ✓ **Correct answer**
- B. Mock
- C. Protest
- D. Borrow

'wallow' means to roll about (as in mud or water).

B. wrong: 'mock' means to ridicule, not to wallow.

C. wrong: 'protest' means to object, not to wallow.

D. wrong: 'borrow' means to take on loan, not to wallow.

Question 142 CONNOISSEUR

CONNOISSEUR

- A. Guide
- B. Artist
- C. Expert critic of art ✓ **Correct answer**
- D. Teacher

A. wrong: a guide is not a connoisseur.

B. wrong: an artist creates art; a connoisseur judges it.

C. correct: a connoisseur is an expert critic (judge) of art.

D. wrong: a teacher is not a connoisseur.

Question 143 ECCENTRIC

ECCENTRIC

- A. Lunatic
- B. Stern
- C. Upset
- D. Odd ✓ **Correct answer**

A. wrong: 'lunatic' means insane, which is stronger than eccentric.

B. wrong: 'stern' means severe, not eccentric.

oset means disturbed, not eccentric.

D. correct: 'eccentric' means odd or unconventional.

Question 144 BOULDER

BOULDER

- A. Rounded stone / hill ✓ **Correct answer**
- B. Builder
- C. Magnanimity
- D. Magnitude

A. correct: a boulder is a large rounded stone.

B. wrong: a builder is a person who builds, not a boulder.

C. wrong: magnanimity means generosity, not a boulder.

D. wrong: magnitude means size or extent, not a boulder.

Question 145 SLUMBER

SLUMBER

- A. Heap
- B. Humble
- C. Knee
- D. Sleep ✓ **Correct answer**

A. wrong: a heap is a pile, not slumber.

B. wrong: humble means modest, not slumber.

C. wrong: a knee is a joint, not slumber.

D. correct: 'slumber' means sleep.

146 EXCREMENT

EXCREMENT

- A. Increment
- B. Waste matter expelled from body ✓ **Correct answer**
- C. Excitement
- D. Disagreement

A. wrong: increment means an increase, not excrement.

B. correct: excrement is waste matter expelled from the body.

C. wrong: excitement means enthusiasm, not excrement.

D. wrong: disagreement means a difference of opinion, not excrement.

Question 147 VISAGE

VISAGE

- A. Vision
- B. Illusion
- C. Trunk less
- D. A person’s face ✓ **Correct answer**

A. wrong: vision means sight, not visage.

B. wrong: illusion means a false impression, not visage.

C. wrong: this is not the meaning of visage.

D. correct: 'visage' means a person's face.

Question 148 FELICITY

FELICITY

nse Happiness ✓ **Correct answer**

- B. Respite
- C. Inspire
- D. Sensational

A. correct: 'felicity' means intense happiness.

B. wrong: respite means a pause or rest, not felicity.

C. wrong: inspire means to motivate, not felicity.

D. wrong: sensational means causing excitement, not felicity.

Question 149 ENMESHED

ENMESHED

- A. Sojourn
- B. Entangled ✓ **Correct answer**
- C. Gallows
- D. Cascade

A. wrong: sojourn means a temporary stay, not enmeshed.

B. correct: 'enmeshed' means entangled (caught in a mesh or snare).

C. wrong: gallows is a structure for hanging, not enmeshed.

D. wrong: cascade means a waterfall, not enmeshed.

Question 150 CAPTIVATE

CAPTIVATE

- A. Hesitate
- B. Concentrate
- C. Hate

cinate ✓ **Correct answer**

A. wrong: hesitate means to pause in doubt, not to captivate.

B. wrong: concentrate means to focus, not to captivate.

C. wrong: hate is the opposite of captivate.

D. correct: 'captivate' means to fascinate or charm.

Question 151 Book lungs are present in arthropods

Book lungs are present in arthropods for exchange of gases in class:

- A. Crustacea
- B. Insecta
- C. Myriapoda
- D. Arachnida ✓ **Correct answer**

A. wrong: crustaceans breathe by gills, not book lungs.

B. wrong: insects breathe by tracheae, not book lungs.

C. wrong: myriapods breathe by tracheae, not book lungs.

D. correct: book lungs are present in arachnids (spiders, scorpions) for the exchange of gases.

Question 152 Larvae of which group are similar

Larvae of which group are similar to chordates?

- A. Echinodermata ✓ **Correct answer**
- B. Annelida
- C. Arthropoda
- D. Nematoda

…e larvae of echinoderms (the dipleurula larva) resemble chordate larvae, reflecting the deuterostome relationship between echinoderms and chordates.

B. wrong: annelid larvae do not resemble chordates.

C. wrong: arthropod larvae do not resemble chordates.

D. wrong: nematode larvae do not resemble chordates.

Question 153 Type of respiration which involves step

Type of respiration which involves step by step breakdown of carbon chain molecules in the cell is called:

- A. External respiration
- B. Cellular respiration ✓ **Correct answer**
- C. Pulmonary respiration
- D. Cutaneous respiration

A. wrong: external respiration is gas exchange with the environment, not the breakdown of carbon chains in the cell.

B. correct: cellular respiration is the step-by-step breakdown of carbon-chain molecules (glucose) within the cell, releasing energy.

C. wrong: pulmonary respiration is breathing through the lungs, not the breakdown of carbon chains in the cell.

D. The printed key: wrong: cutaneous respiration is gas exchange through the skin, not the breakdown of carbon chains in the cell. (PRINTED-KEY ERROR CORRECTED: the printed key records D (Cutaneous respiration), but the step-by-step breakdown of carbon-chain molecules in the cell is cellular respiration, so the answer is corrected to B. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

154 Instrument which is used to measure

Instrument which is used to measure relative abilities of different pigments to absorb different wavelengths of light is called:

- A. Spectrometer
- B. Photometer
- C. Barometer
- D. Spectrophotometer ✓ **Correct answer**

A. wrong: a spectrometer measures spectra in general; the instrument for pigment absorption at different wavelengths is the spectrophotometer.

B. The printed key: wrong: a photometer measures light intensity, not the absorption of different wavelengths by pigments.

C. wrong: a barometer measures atmospheric pressure.

D. correct: a spectrophotometer measures the relative ability of pigments to absorb different wavelengths of light (their absorption spectrum). (PRINTED-KEY ERROR CORRECTED: the printed key records B (Photometer), but the instrument that measures pigment absorption at different wavelengths is the spectrophotometer, so the answer is corrected to D. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 155 End products of yeast fermentation bacterial

End products of yeast fermentation, bacterial fermentation and anaerobic respiration are

- A. Citric acid, lactic acid, carbon dioxide and water
- B. Ethyl alcohol, citric acid and carbon dioxide
- C. Ethyl alcohol, lactic acid, carbon dioxide and water ✓ **Correct answer**
- D. Methanol, lactic acid and citric acid

A. wrong: citric acid is not an end product of these fermentations.

ric acid is not an end product, and lactic acid is missing.

C. correct: yeast fermentation gives ethyl alcohol and carbon dioxide, bacterial fermentation gives lactic acid, and anaerobic respiration gives these products (with water).

D. wrong: methanol and citric acid are not the end products of these fermentations.

Question 156 In human beings what is the

In human beings, what is the function of amylase in digestion?

- A. Digestion of triglycerides
- B. Digestion of lipids
- C. Digestion of all types of food
- D. Digestion of carbohydrates ✓ **Correct answer**

A. wrong: triglycerides are digested by lipase, not amylase.

B. wrong: lipids are digested by lipase, not amylase.

C. wrong: amylase digests only carbohydrates, not all types of food.

D. correct: amylase digests carbohydrates (starch) in human beings.

Question 157 Where is the ileocolic sphincter located

Where is the ileocolic sphincter located in your body?

- A. At the junction of esophagus and stomach
- B. At the junction of stomach and small intestine
- C. At the junction of ileum and large intestine ✓ **Correct answer**
- D. At the junction of small intestine and large intestine

A. wrong: the cardiac sphincter is at the oesophagus–stomach junction, not the ileocolic sphincter.

B. wrong: the pyloric sphincter is at the stomach–small intestine junction.

e ileocolic sphincter (ileocaecal valve) is at the junction of the ileum and the large intestine.

D. wrong: the precise junction is the ileum with the large intestine, not the small intestine in general.

Question 158 The term which is employed to

The term which is employed to the loss of appetite due to fear of becoming obese is

- A. Obesity
- B. Anorexia nervosa ✓ **Correct answer**
- C. Dyspepsia
- D. Bulimia nervosa

A. wrong: obesity is excess body weight, not the loss of appetite from fear of becoming obese.

B. correct: anorexia nervosa is the loss of appetite due to fear of becoming obese.

C. wrong: dyspepsia is indigestion, not loss of appetite from fear of obesity.

D. wrong: bulimia nervosa is binge eating followed by purging, not loss of appetite from fear of obesity.

Question 159 Which one of the following acts

Which one of the following acts as functional unit of lungs in man?

- A. Air sac ✓ **Correct answer**
- B. Larynx
- C. Trachea
- D. Bronchioles

A. correct: the air sac (alveolus) is the functional unit of the lungs in man (gas exchange takes place there).

The larynx is the voice box, not the functional unit of the lungs.

C. wrong: the trachea is the windpipe, not the functional unit of the lungs.

D. wrong: the bronchioles conduct air; the functional unit is the air sac.

Question 160 Which one of following factors is

Which one of following factors is directly proportional to oxygen carrying capacity of haemoglobin?

- A. Carbon dioxide
- B. Temperature
- C. pH ✓ **Correct answer**
- D. Light

A. wrong: carbon dioxide decreases haemoglobin's oxygen affinity (Bohr effect), so it is inversely related to oxygen carriage.

B. wrong: a rise in temperature decreases haemoglobin's oxygen affinity.

C. correct: the oxygen-carrying capacity (affinity) of haemoglobin rises with pH — a higher pH (lower CO_2) increases oxygen binding (the Bohr effect), so pH is directly related to oxygen carriage.

D. wrong: light has no effect on haemoglobin's oxygen-carrying capacity.

Question 161 Expiration in human beings is carried

Expiration in human beings is carried out by

- A. Contraction of lungs
- B. Contraction of intercostal membrane
- C. Relaxation of intercostal and diaphragm muscles ✓ **Correct answer**
- D. Contraction of diaphragm muscles

The lungs have no muscles of their own to contract; expiration is by relaxation of the respiratory muscles.

B. wrong: expiration is by relaxation, not contraction, of the intercostal muscles.

C. correct: expiration is carried out by the relaxation of the intercostal and diaphragm muscles, which reduces the thoracic volume.

D. wrong: contraction of the diaphragm causes inspiration, not expiration.

Question 162 Which one of the following is

Which one of the following is a precursor of steroid hormones?

- A. Glycerol
- B. Sterol
- C. Amino acids
- D. Cholesterol ✓ **Correct answer**

A. wrong: glycerol is a component of fats, not the precursor of steroid hormones.

B. wrong: 'sterol' is the class name; the specific precursor is cholesterol.

C. wrong: amino acids are the precursors of peptide hormones, not of steroid hormones.

D. correct: cholesterol is the precursor from which steroid hormones are synthesised.

Question 163 Granulocytes or white blood cells are

Granulocytes or white blood cells are produced in

- A. Lymph nodes
- B. Red bone marrow ✓ **Correct answer**
- C. Tonsils
- D. Spleen

A. wrong: lymph nodes filter lymph; granulocytes are not produced there.

granulocytes (white blood cells) are produced in the red bone marrow.

C. wrong: tonsils are lymphoid tissue; granulocytes are not produced there.

D. wrong: the spleen stores and destroys blood cells; granulocytes are produced in the red bone marrow.

Question 164 Which one of the following statements

Which one of the following statements best describes the function of sinoatrial node?

- A. It sends out electrical impulses to atrial muscles causing both atria to contract ✓ **Correct answer**
- B. It consists of small number of diffusely oriented cardiac fibres
- C. It sends out electrical impulses to ventricular muscles causing both ventricles to contract
- D. It is present at upper end of left atrium

A. correct: the sinoatrial node is the pacemaker; it sends impulses to the atrial muscles, causing both atria to contract.

B. wrong: this describes the structure, not the function of the sinoatrial node.

C. wrong: the atrioventricular node, not the sinoatrial node, sends impulses to the ventricles.

D. wrong: the sinoatrial node is at the upper end of the right atrium, not the left.

Question 165 The flow of lymph in lymphatic

The flow of lymph in lymphatic vessels is maintained by:

- A. Heart, activity of smooth muscles and valves
- B. Activity of skeletal muscles, heart and breathing movements
- C. Breathing movements, activity of skeletal muscles and valves ✓ **Correct answer**
- D. Exercise, breathing movements and heart

e heart does not pump lymph.

B. wrong: the heart does not maintain lymph flow.

C. correct: the flow of lymph is maintained by breathing movements, the activity of skeletal muscles, and the valves in the lymphatic vessels.

D. wrong: the heart does not maintain lymph flow.

Question 166 Metabolic waste from metabolism of nucleic

Metabolic waste from metabolism of nucleic acid is

- A. Uric acid ✓ **Correct answer**
- B. Creatine
- C. Urea
- D. Creatinine

A. correct: uric acid is the metabolic waste produced from the metabolism of nucleic acids (purines).

B. wrong: creatine is an energy store in muscle, not a nucleic-acid waste.

C. wrong: urea is the waste from protein (amino-acid) metabolism, not from nucleic acids.

D. wrong: creatinine is the waste from creatine metabolism in muscle, not from nucleic acids.

Question 167 The central metabolic station and clearing

The central metabolic station and clearing house of a body is

- A. Liver ✓ **Correct answer**
- B. Kidney
- C. Nephron
- D. Glomerulus

The liver is the central metabolic station and clearing house of the body.

B. wrong: the kidney excretes wastes; it is not the central metabolic station.

C. wrong: the nephron is the functional unit of the kidney, not the metabolic station.

D. wrong: the glomerulus filters blood in the kidney; it is not the metabolic station.

Question 168 The muscles that control urine in

The muscles that control urine in bladder are known as

- A. Striated muscles
- B. Smooth muscles
- C. Sphincter muscles ✓ **Correct answer**
- D. Circular muscles

A. wrong: striated muscles are skeletal muscles; the bladder outlet is controlled by sphincters.

B. wrong: the bladder wall is smooth muscle, but the muscles that control (open/close) urine flow are the sphincters.

C. correct: the sphincter muscles control the passage of urine from the bladder.

D. wrong: the sphincters are the muscles that control urine, not circular muscles in general.

Question 169 The living cells of cartilage are

The living cells of cartilage are called

- A. Chrondrocytes ✓ **Correct answer**
- B. Osteoblasts
- C. Ostecytes
- D. Osteoclasts

...e living cells of cartilage are chondrocytes (spelled 'Chrondrocytes' in the source).

B. wrong: osteoblasts are bone-forming cells, not cartilage cells.

C. wrong: osteocytes are mature bone cells, not cartilage cells.

D. wrong: osteoclasts resorb bone; they are not cartilage cells.

Question 170 The disease which causes immobility and

The disease which causes immobility and fusion of vertebral joints is

- A. Osteomalacia (soft bones)
- B. Disc slip
- C. Arthritis
- D. Spondylosis ✓ **Correct answer**

A. wrong: osteomalacia softens bones; it does not fuse vertebral joints.

B. wrong: a slipped disc displaces a disc; it does not fuse vertebral joints.

C. wrong: arthritis inflames joints; the fusion of vertebral joints is spondylosis.

D. correct: spondylosis causes immobility and fusion of the vertebral joints.

Question 171 During muscle contraction

During muscle contraction

- A. I-band shortens ✓ **Correct answer**
- B. Myosin filaments shorten
- C. Actin filaments shorten
- D. Z-line disappears

A. correct: during muscle contraction the I-band shortens (the actin filaments slide over the myosin filaments, bringing the Z-lines closer).

e myosin filaments do not shorten; the actin filaments slide over them.

C. wrong: the actin filaments do not shorten; they slide over the myosin filaments.

D. wrong: the Z-lines do not disappear; they move closer together.

Question 172 Hormones are the organic compounds of

Hormones are the organic compounds of varying structural complexity. Which of the following is not a function or property of these compounds?

- A. They initiate new biochemical reactions ✓ **Correct answer**
- B. They are poured directly into blood
- C. They may be proteins
- D. They affect target cells

A. correct as the non-function: hormones do not initiate new biochemical reactions; they regulate and modify reactions already occurring.

B. wrong: hormones are poured directly into the blood — this is a true property.

C. wrong: hormones may be proteins — this is a true property.

D. wrong: hormones affect target cells — this is a true property.

Question 173 Reflexes and instincts type of behaviours

Reflexes and instincts type of behaviours respond to which combination /s?

- A. Biological rhythms, territorial, courtship and development
- B. The responses that do produce same result in different conditions
- C. Aggression, mating and altruism ✓ **Correct answer**
- D. The responses that are predetermined like differentiation

A. wrong: these are other categories of behaviour, not the combination reflexes and instincts respond to.

flexes and instincts do not produce the same result under different conditions.

C. correct: reflexes and instincts are the innate behaviours concerned with aggression, mating and altruism.

D. wrong: 'predetermined like differentiation' does not describe the combination reflexes and instincts respond to.

Question 174 A typical neuron at rest

A typical neuron at rest

- A. Is more positive outside than inside ✓ **Correct answer**
- B. Is more negative outside than inside
- C. Has no charge on either side
- D. has an equal charge on either side

A. correct: a typical neuron at rest is more positive outside than inside (the inside is about −70 mV relative to the outside).

B. wrong: the outside is positive relative to the inside at rest.

C. wrong: there is a resting potential across the membrane.

D. wrong: the charges are unequal (inside negative, outside positive).

Question 175 The first cells produced by the

The first cells produced by the repeated cell division of germinal epithelium of testis are

- A. Interstitial cells
- B. Spermatogonia ✓ **Correct answer**
- C. Secondary spermatocytes
- D. Spermatids

terstitial (Leydig) cells secrete testosterone; they are not the first cells from the germinal epithelium.

B. correct: the first cells produced by the repeated division of the germinal epithelium of the testis are the spermatogonia.

C. wrong: secondary spermatocytes arise later, after the first meiotic division.

D. wrong: spermatids arise much later, after the second meiotic division.

Question 176 Which of the following sequence is

Which of the following sequence is correct?

- A. LH → FSH → Estrogen → Progesterone
- B. FSH → LH → Progesterone → Estrogen
- C. FSH → Estrogen → Progesterone → LH
- D. FSH → Estrogen → LH → Progesterone ✓ **Correct answer**

A. wrong: FSH comes first, not LH.

B. wrong: oestrogen precedes the LH surge, and progesterone comes last.

C. wrong: the LH surge precedes progesterone secretion.

D. correct: FSH stimulates oestrogen secretion, the oestrogen peak triggers the LH surge (ovulation), and the corpus luteum then secretes progesterone.

Question 177 Which chromosomal abnormality in humans causes

Which chromosomal abnormality in humans causes aggressive and antisocial behavior?

- A. XO
- B. XXY
- C. XYY ✓ **Correct answer**
- D. XXX

) (Turner syndrome) does not cause aggressive and antisocial behaviour.

B. wrong: XXY (Klinefelter syndrome) does not cause aggressive and antisocial behaviour.

C. correct: the XYY chromosomal abnormality in males is associated (in the textbook) with aggressive and antisocial behaviour.

D. wrong: XXX (triple X) does not cause aggressive and antisocial behaviour.

Question 178 Grey equatorial cytoplasm produces

Grey equatorial cytoplasm produces

- A. Muscle cells
- B. Gut
- C. Notochord and neural tube ✓ **Correct answer**
- D. Larval epidermis

A. wrong: the grey equatorial cytoplasm (grey crescent) does not give rise to muscle cells.

B. wrong: the grey crescent does not give rise to the gut (the vegetal yolk does).

C. correct: the grey equatorial cytoplasm (grey crescent) of the frog egg produces the notochord and the neural tube.

D. wrong: the grey crescent does not give rise to the larval epidermis.

Question 179 Sickle cell Anaemia is an example

Sickle cell Anaemia is an example of which type of chromosomal defect?

- A. Chromosomal rearrangement
- B. Transposition of gene
- C. Chromosomal aberration
- D. Point mutation ✓ **Correct answer**

A. wrong: sickle-cell anaemia is not a chromosomal rearrangement.

ickle-cell anaemia is not a transposition of a gene.

C. wrong: sickle-cell anaemia is not a chromosomal aberration.

D. correct: sickle-cell anaemia is caused by a point mutation (a single base change in the beta-globin gene); note the stem loosely calls it a 'chromosomal defect', but the mutation is at the gene level.

Question 180 The karyotype of an individual is

The karyotype of an individual is _____ of chromosomes.

- A. Number
- B. Types
- C. Number, types and chemical composition
- D. Number and types ✓ **Correct answer**

A. wrong: a karyotype shows both the number and the types of chromosomes, not the number alone.

B. wrong: a karyotype shows both the number and the types of chromosomes, not the types alone.

C. wrong: a karyotype does not show the chemical composition of chromosomes.

D. correct: the karyotype of an individual is the number and types of chromosomes.

Question 181 The process of replication of DNA

The process of replication of DNA begins at

- A. One place only without any specific sequence of DNA
- B. One or more places without any specific sequence of DNA
- C. Any place with the uncoiling of two strands of DNA
- D. One or more places where there is a specific sequence of nucleotides ✓ **Correct answer**

plication begins at specific sequences (origins), and there may be several of them.

B. wrong: replication begins at specific nucleotide sequences (origins of replication).

C. wrong: replication does not begin at any arbitrary place.

D. correct: DNA replication begins at one or more origins, which are specific sequences of nucleotides.

Question 182 Amino acid attaches at which site

Amino acid attaches at which site of RNA

- A. Anticodon site
- B. Ribosomes recognition site
- C. 3’-site with terminal OH ✓ **Correct answer**
- D. Activation enzyme recognition site

A. wrong: the anticodon site pairs with the mRNA codon; the amino acid does not attach there.

B. wrong: the amino acid does not attach at the ribosome-recognition site.

C. correct: the amino acid attaches to the 3' end of the tRNA, at the terminal –OH group.

D. wrong: the amino acid does not attach at the enzyme-recognition site.

Question 183 Microtubules of spindle fibres are composed

Microtubules of spindle fibres are composed of a protein called

- A. Tubulin ✓ **Correct answer**
- B. Actin
- C. Myosin
- D. Troponin

...e microtubules of spindle fibres are composed of the protein tubulin.

B. wrong: actin forms microfilaments, not microtubules.

C. wrong: myosin is a motor protein of muscle, not the protein of microtubules.

D. wrong: troponin regulates muscle contraction; it is not the protein of microtubules.

Question 184 The kinetochore fibres contract and spindle

The kinetochore fibres contract and spindle or pole fibres elongate during

- A. Prophase I
- B. Metaphase I
- C. Telophase I
- D. Anaphase I ✓ **Correct answer**

A. wrong: in prophase I the chromosomes condense and pair; the fibres do not yet contract and elongate.

B. wrong: in metaphase I the chromosomes align at the equator; the fibres do not contract and elongate.

C. wrong: in telophase I the nuclei reform; the fibres do not contract and elongate.

D. correct: during anaphase I the kinetochore fibres contract (pulling homologous chromosomes apart) and the spindle (pole) fibres elongate.

Question 185 Cell death due to tissue damage

Cell death due to tissue damage is called

- A. Necrosis ✓ **Correct answer**
- B. Metastasis
- C. Apoptosis
- D. Epistasis

ell death due to tissue damage is called necrosis.

B. wrong: metastasis is the spread of cancer cells, not cell death from tissue damage.

C. wrong: apoptosis is programmed (natural) cell death, not death from tissue damage.

D. wrong: epistasis is a gene interaction, not cell death.

Question 186 When a disease is transmitted directly

When a disease is transmitted directly from an affected father to his son, it is called:

- A. X-linked
- B. Autosomal
- C. Y-linked ✓ **Correct answer**
- D. X and Y-linked

A. wrong: an X-linked trait from a father passes to his daughters, not to his sons.

B. wrong: an autosomal trait is not transmitted directly from father to son in this specific pattern.

C. correct: a Y-linked trait is passed directly from an affected father to all his sons (the Y chromosome passes only from father to son).

D. wrong: the father-to-son pattern is Y-linked, not X- and Y-linked.

Question 187 Epistasis is a relationship between

Epistasis is a relationship between:

- A. Alleles of a gene
- B. Two different genes at the same locus
- C. Two contrasting traits
- D. Two different genes at different loci ✓ **Correct answer**

A. wrong: epistasis is not a relationship between alleles of one gene (that is dominance).

o genes cannot occupy the same locus.

C. wrong: epistasis is a relationship between genes, not between traits.

D. correct: epistasis is the interaction (masking) between two different genes located at different loci.

Question 188 Gene for albinism in man is

Gene for albinism in man is present on chromosome number:

- A. 11 ✓ **Correct answer**
- B. 22
- C. 21
- D. 12

A. correct: the gene for albinism (tyrosinase) in man is present on chromosome 11.

B. wrong: the albinism gene is on chromosome 11, not 22.

C. wrong: the albinism gene is on chromosome 11, not 21.

D. wrong: the albinism gene is on chromosome 11, not 12.

Question 189 Gene can be synthesized in laboratory

Gene can be synthesized in laboratory from messenger RNA by using:

- A. Restriction enzymes
- B. cDNA (complementary DNA)
- C. Vector
- D. Reverse transcriptase ✓ **Correct answer**

A. wrong: restriction enzymes cut DNA; they do not synthesise a gene from mRNA.

B. wrong: cDNA is the product of the synthesis, not the enzyme used.

vector carries DNA into a host, it does not synthesise a gene from mRNA.

D. correct: a gene can be synthesised in the laboratory from messenger RNA using the enzyme reverse transcriptase (which makes cDNA from the mRNA template).

Question 190 Antibiotic resistance gene for tetracycline and

Antibiotic resistance gene for tetracycline and ampicillin are present in the plasmid

- A. pSC 101
- B. pCR 101
- C. pBR 322 ✓ **Correct answer**
- D. pBR 233

A. wrong: pSC101 carries tetracycline resistance only, not ampicillin resistance.

B. wrong: this is not the plasmid carrying both resistance genes.

C. correct: the plasmid pBR322 carries the antibiotic resistance genes for both tetracycline and ampicillin.

D. wrong: this is not the plasmid carrying both resistance genes.

Question 191 Cloning is a form of

Cloning is a form of

- A. Sexual Reproduction
- B. Asexual Reproduction ✓ **Correct answer**
- C. Vegetative Propagation
- D. Genetic Recombination

A. wrong: cloning does not involve the fusion of gametes, so it is not sexual reproduction.

B. correct: cloning is a form of asexual reproduction (the offspring is genetically identical to the parent).

getative propagation is a plant-specific form of asexual reproduction, not cloning in general.

D. wrong: cloning involves no genetic recombination.

Question 192 Group of interbreeding individuals of particular

Group of interbreeding individuals of particular species, sharing common geographical area is called:

- A. Population ✓ **Correct answer**
- B. Community ecology
- C. Community
- D. Autecology

A. correct: a group of interbreeding individuals of a particular species sharing a common geographical area is a population.

B. wrong: community ecology is the study of communities, not the group itself.

C. wrong: a community is a group of different species, not one interbreeding species.

D. wrong: autecology is the study of a single species' ecology, not the group itself.

Question 193 Which of the following proteins is

Which of the following proteins is common in man and aerobic bacteria?

- A. Haemoglobin
- B. Myoglobin
- C. Cytochrome c ✓ **Correct answer**
- D. Pilin

A. wrong: haemoglobin is found in man but not in aerobic bacteria.

B. wrong: myoglobin is found in muscle, not in aerobic bacteria.

ytochrome c is a respiratory protein common to man and aerobic bacteria (it occurs in the electron transport chain of both).

D. wrong: pilin is a bacterial protein, not common to man.

Question 194 Ozone filters ultraviolet radiations from the

Ozone filters ultraviolet radiations from the sun in the upper

- A. Biosphere
- B. Atmosphere ✓ **Correct answer**
- C. Lithosphere
- D. Hydrosphere

A. wrong: ozone filters UV in the upper atmosphere, not the biosphere.

B. correct: the ozone layer in the upper atmosphere filters ultraviolet radiation from the sun.

C. wrong: the lithosphere is the Earth's crust, not where ozone filters UV.

D. wrong: the hydrosphere is the water of the Earth, not where ozone filters UV.

Question 195 A parasite living inside body of

A parasite living inside body of the host is called

- A. Ectoparasite
- B. Obligate parasite
- C. Facultative parasite
- D. Endoparasite ✓ **Correct answer**

A. wrong: an ectoparasite lives on the outside of the host's body.

B. wrong: an obligate parasite must live on a host, but the term for one living inside is endoparasite.

facultative parasite can live freely or as a parasite; the term for one living inside is endoparasite.

D. correct: a parasite living inside the body of the host is an endoparasite.

Question 196 An association between two organisms benefiting

An association between two organisms benefiting both is called

- A. Commensalism
- B. Parasitism
- C. Predation
- D. Symbiosis ✓ **Correct answer**

A. wrong: in commensalism only one organism benefits; the other is unaffected.

B. wrong: in parasitism one organism benefits at the other's expense.

C. wrong: in predation one organism kills and eats the other.

D. correct: an association between two organisms benefiting both is called symbiosis (mutualism).

Question 197 In aquatic ecosystem human activities may

In aquatic ecosystem, human activities may accelerate the process of

- A. Eutrophication ✓ **Correct answer**
- B. Photosynthesis
- C. Decomposition
- D. Recycling

A. correct: human activities (fertiliser run-off, sewage) accelerate eutrophication in aquatic ecosystems.

B. wrong: human activities do not accelerate photosynthesis in aquatic ecosystems.

man activities do not specifically accelerate decomposition.

D. wrong: human activities do not accelerate recycling in this sense.

Question 198 Beri Beri is due to

Beri Beri is due to

- A. Metabolic disorder
- B. Chemical causes
- C. Nutritional deficiency ✓ **Correct answer**
- D. Mental Illness

A. wrong: beri beri is not a metabolic disorder.

B. wrong: beri beri is not caused by chemicals.

C. correct: beri beri is due to a nutritional deficiency (lack of vitamin B1/thiamine).

D. wrong: beri beri is not a mental illness.

Question 199 The natural heat energy trapped underground

The natural heat energy trapped underground is

- A. Geothermal energy ✓ **Correct answer**
- B. Thermal energy
- C. Electric energy
- D. Solar energy

A. correct: the natural heat energy trapped underground is geothermal energy.

B. wrong: thermal energy is heat in general, not the specific underground source.

C. wrong: electric energy is a different form of energy.

D. wrong: solar energy comes from the sun, not from underground.

200 Which of the following is the

Which of the following is the lowest level of biological organization with respect to others?

- A. Multicellular organisms ✓ **Correct answer**
- B. Biosphere
- C. Species
- D. Population

A. correct: of the options given, the multicellular organism is the lowest level of biological organisation (organism < population < species/community < biosphere).

B. wrong: the biosphere is the highest level, not the lowest.

C. wrong: a species is a taxonomic category, not a level below the organism.

D. wrong: a population is a group of organisms, a level above the individual organism.

Question 201 When an electron pair is shared

When an electron pair is shared between two atoms

- A. Two covalent bonds are formed
- B. Hydrogen bond is formed
- C. Single covalent bond is formed ✓ **Correct answer**
- D. Ionic bond is formed

A. wrong: one shared pair forms one covalent bond, not two.

B. wrong: a shared electron pair forms a covalent bond, not a hydrogen bond.

C. correct: when one electron pair is shared between two atoms, a single covalent bond is formed.

D. wrong: an ionic bond is formed by the transfer of electrons, not by sharing.

202 The first microbe to have the

The first microbe to have the genome completely sequenced and was published on July 28th, 1995 was

- A. Hyphomicrobium
- B. Haemophilus aquaticus
- C. Haemophillus malariae
- D. Haemophillus infulenzae ✓ **Correct answer**

A. wrong: Hyphomicrobium was not the first microbe to have its genome sequenced.

B. wrong: this is not the organism whose genome was first sequenced.

C. wrong: this is not the organism whose genome was first sequenced.

D. correct: Haemophilus influenzae was the first microbe to have its genome completely sequenced, published on 28 July 1995 (spelled 'Haemophillus infulenzae' in the source).

Question 203 An activated enzyme consisting of polypeptide

An activated enzyme consisting of polypeptide and a cofactor is known as

- A. Amylase
- B. Apoenzyme
- C. Haloenzyme ✓ **Correct answer**
- D. Coenzyme

A. wrong: amylase is a specific digestive enzyme, not the general name for an activated enzyme.

B. wrong: the apoenzyme is the polypeptide alone, without its cofactor.

C. correct: an activated enzyme consisting of a polypeptide and a cofactor is a holoenzyme (spelled 'Haloenzyme' in the source).

D. wrong: the coenzyme is the non-protein cofactor itself, not the complete activated

Question 204 forms weak linkages with enzymes and

_____ forms weak linkages with enzymes and their effect can be neutralized completely or partly by an increase in the concentration of the substrate.

- A. Only competitive Inhibitors
- B. Reversible inhibitors ✓ **Correct answer**
- C. Irreversible inhibitors
- D. Both reversible and irreversible inhibitors

A. wrong as the answer: competitive inhibitors are the reversible inhibitors overcome by substrate, but the key records the broader term.

B. correct: reversible inhibitors form weak linkages with enzymes, and their effect can be neutralised completely or partly by increasing the substrate concentration.

C. wrong: irreversible inhibitors form strong (covalent) linkages and are not overcome by increasing the substrate.

D. wrong: irreversible inhibitors do not form weak linkages and are not overcome by substrate. (Note: competitive inhibitors are the reversible inhibitors whose effect is overcome by substrate, so the two descriptions overlap; the key records B.)

Question 205 In prokaryotic cell wall strengthening material

In prokaryotic cell, wall strengthening material is

- A. Cellulose
- B. Silica
- C. Chitin
- D. Peptidoglycan ✓ **Correct answer**

A. wrong: cellulose strengthens plant cell walls, not prokaryotic walls.

ica is not the wall-strengthening material of prokaryotes.

C. wrong: chitin strengthens fungal cell walls, not prokaryotic walls.

D. correct: peptidoglycan (murein) is the wall-strengthening material of the prokaryotic cell wall.

Question 206 The entire cell wall of bacteria

The entire cell wall of bacteria is often regarded as a single huge molecule or molecular complex called

- A. Capsule
- B. Secondary wall
- C. Slime capsule
- D. Sacculus ✓ **Correct answer**

A. wrong: the capsule is an outer slime layer, not the whole cell wall regarded as one molecule.

B. wrong: bacteria do not have a secondary wall in this sense.

C. wrong: the slime capsule is an outer layer, not the whole cell wall regarded as one molecule.

D. correct: the entire bacterial cell wall is often regarded as a single huge molecule (molecular complex) called the sacculus.

Question 207 Krebss cycle takes place in

Krebs’s cycle takes place in

- A. Ribosomes
- B. Golgi apparatus
- C. Mitochondria ✓ **Correct answer**
- D. Endoplasmic Reticulum

ribosomes are the sites of protein synthesis, not of the Krebs cycle.

B. wrong: the Golgi apparatus modifies and packages proteins; the Krebs cycle does not take place there.

C. correct: the Krebs cycle takes place in the mitochondria (in the mitochondrial matrix).

D. wrong: the endoplasmic reticulum is involved in protein and lipid synthesis, not the Krebs cycle.

Question 208 Chemically viruses are made up of

Chemically, viruses are made up of

- A. Nucleic acid only
- B. Protein only
- C. Nucleic acid and protein ✓ **Correct answer**
- D. Core and coat

A. wrong: viruses also have a protein coat.

B. wrong: viruses also contain nucleic acid.

C. correct: chemically, viruses are made up of nucleic acid (DNA or RNA) and protein (the capsid).

D. wrong: 'core and coat' describes the structure, not the chemical composition.

Question 209 Widespread epidemic disease influenza is caused

Widespread epidemic disease, influenza is caused by

- A. DNA virus
- B. RNA enveloped virus ✓ **Correct answer**
- C. DNA enveloped virus
- D. RNA virus

fluenza is caused by an RNA virus, not a DNA virus.

B. correct: influenza is caused by an RNA enveloped virus (an orthomyxovirus).

C. wrong: influenza is caused by an RNA virus, not a DNA virus.

D. wrong as the specific answer: influenza is an RNA virus, but the precise description is an RNA enveloped virus.

Question 210 When the division of cells is

When the division of cells is in three planes, the arrangement is known as

- A. Diplococcus
- B. Sarcina ✓ **Correct answer**
- C. Streptococcus
- D. Staphylococcus

A. wrong: diplococcus is division in one plane giving pairs.

B. correct: when bacterial cells divide in three planes, the arrangement is a sarcina (a cubical packet of eight cells).

C. wrong: streptococcus is division in one plane giving chains.

D. wrong: staphylococcus is division in several planes irregularly, giving grape-like clusters.

Question 211 Bacterial death rate is equal to

Bacterial ‘death rate’ is equal to ‘birth rate; in

- A. Lag phase
- B. Log phase
- C. Death phase
- D. Stationary phase ✓ **Correct answer**

the lag phase the cells are adapting and the birth rate exceeds the death rate.

B. wrong: in the log phase the birth rate far exceeds the death rate.

C. wrong: in the death phase the death rate exceeds the birth rate.

D. correct: in the stationary phase the bacterial death rate equals the birth rate, so the population stays constant.

Question 212 Trypanosoma is a human parasite causing

Trypanosoma is a human parasite causing

- A. African sleeping sickness ✓ **Correct answer**
- B. European sleeping sickness
- C. Indonesian sleeping sickness
- D. American sleeping sickness

A. correct: Trypanosoma (T. brucei) is the human parasite causing African sleeping sickness.

B. wrong: there is no European sleeping sickness caused by Trypanosoma.

C. wrong: there is no Indonesian sleeping sickness caused by Trypanosoma.

D. wrong: American trypanosomiasis (Chagas disease) is caused by Trypanosoma cruzi, but the classic 'sleeping sickness' is the African form.

Question 213 The feeding stage of slime mold

The feeding stage of slime mold is a

- A. Gastrozoid
- B. Sporozoite
- C. Plasmodium ✓ **Correct answer**
- D. Merozote

gastrozoid is a feeding polyp of a hydrozoan, not the feeding stage of a slime mold.

B. wrong: a sporozoite is an infective stage of a sporozoan, not the feeding stage of a slime mold.

C. correct: the feeding stage of a slime mold is a plasmodium (a multinucleate mass of cytoplasm).

D. wrong: a merozoite is a stage of a malarial parasite, not the feeding stage of a slime mold.

Question 214 Drug obtained from fungus used for

Drug obtained from fungus used for lowing blood cholesterol is

- A. Lovastatin ✓ **Correct answer**
- B. Cyclosporin
- C. Ergotin
- D. Griseofulvin

A. correct: lovastatin is the drug obtained from a fungus (Aspergillus terreus) used for lowering blood cholesterol (the stem prints 'lowing', a typo for 'lowering').

B. wrong: cyclosporin is a fungal drug used as an immunosuppressant, not for lowering cholesterol.

C. wrong: ergotamine/ergotin is a fungal drug used for migraine, not for lowering cholesterol.

D. wrong: griseofulvin is a fungal drug used as an antifungal, not for lowering cholesterol.

Question 215 Fungi store surplus food in the

Fungi store surplus food in the form of

ulose

- B. Glycogen ✓ **Correct answer**
- C. Starch
- D. Both B and C

A. wrong: fungi do not store food as cellulose.

B. correct: fungi store surplus food in the form of glycogen.

C. wrong: starch is the storage carbohydrate of plants, not of fungi.

D. wrong: fungi store glycogen only, not starch.

Question 216 The ecological role of fungi as

The ecological role of fungi as decomposers is paralleled only by

- A. Prions
- B. Algae
- C. Bacteria ✓ **Correct answer**
- D. Viruses

A. wrong: prions are infectious proteins, not decomposers.

B. wrong: algae are producers, not decomposers.

C. correct: the ecological role of fungi as decomposers is paralleled only by bacteria.

D. wrong: viruses are parasites, not decomposers.

Question 217 Vascular System absent gametophyte dominant sporophyte

"Vascular System absent; gametophyte dominant, sporophyte attached to gametophyte; homosporous" are distinguishing characters of

- B. Pteropsida
- C. Angiosperms
- D. Bryophyta ✓ **Correct answer**

A. wrong: Psilopsida are vascular plants with a dominant sporophyte.

B. wrong: Pteropsida (ferns) are vascular with a dominant sporophyte.

C. wrong: angiosperms are vascular with a dominant sporophyte.

D. correct: 'vascular system absent; gametophyte dominant, sporophyte attached to gametophyte; homosporous' are the distinguishing characters of the Bryophyta.

Question 218 Which of the following features differentiate

Which of the following features differentiate angiosperms from gymnosperms?

- A. Pollens disperse by air
- B. Haploid microspores
- C. Ovaries ✓ **Correct answer**
- D. Pollen tubes

A. wrong: pollen dispersal by air occurs in both angiosperms and gymnosperms.

B. wrong: haploid microspores occur in both angiosperms and gymnosperms.

C. correct: ovaries (enclosed ovules) are the feature that differentiates angiosperms from gymnosperms (gymnosperms have naked ovules).

D. wrong: pollen tubes occur in both angiosperms and gymnosperms.

Question 219 In Pakistan the furniture wood is

In Pakistan, the furniture wood is mainly obtained from the members of family:

- A. Rosaceae

- C. Minosaceae
- D. Fabaceae ✓ **Correct answer**

A. wrong: the rose family is not the main source of furniture wood in Pakistan.

B. wrong: the potato family is not the main source of furniture wood in Pakistan.

C. wrong: this is a misspelling of Mimosaceae, a subfamily of the Fabaceae; the key records the family Fabaceae.

D. correct: in Pakistan, furniture wood is mainly obtained from members of the family Fabaceae (e.g. sheesham, Dalbergia sissoo).

Question 220 Which of the following is exclusive

Which of the following is exclusive character of mammals?

- A. Homeothermic
- B. Hair ✓ **Correct answer**
- C. Poikliothermic
- D. Four chambered heart

A. wrong: homeothermy is shared with birds, so it is not exclusive to mammals.

B. correct: hair is the exclusive character of mammals (no other vertebrate group has hair).

C. wrong: mammals are homeothermic, not poikilothermic.

D. wrong: a four-chambered heart is shared with birds (and crocodiles), so it is not exclusive to mammals.

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