MDCAT (UHS entry test) — 2009 · Solved Past Paper

Body: University of Health Sciences, Lahore (UHS) · **Post:** MDCAT (UHS entry test) · **Year:** 2009 · **Questions:** 220 in the original paper — **206 solved and verified**, 14 excluded as defective (Q3, Q11, Q44, Q58, Q59, Q64, Q71, Q76, Q78, Q91, Q119, Q125, Q169, Q200) · **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 2009 sitting.

Source note: mdcatguide.com compilation 'UHS MDCAT 2009' (26 pages, scanned, no text layer), Paper Code B (Blue), 220 MCQs, 150 minutes, 1100 marks (5 per correct, -1 per wrong), held Sunday 27 September 2009. Sections in the paper's order: Physics 60 (Q1-60), Chemistry 60 (Q61-120), English 30 (Q121-150), Biology 70 (Q151-220). The official UHS answer key is printed at the back of this compilation (PDF p. 20, 'ANSWER KEY — Entrance Test 2009'); verification: official UHS key as reproduced in the ARK book 'MDCAT Past Papers 2008-2016' (mcats-2008-2016.pdf, 180 pp), key table for Entrance Test 2009, Paper Code B, 220 rows, layout-parsed with the ID row skipped (cross-checked against the printed key in this compilation and the scanned official key uhs2009-key.pdf); textbook fact and worked derivations for every answer; no Learnospot/PLS quiz exists for 2009. 9 answers correct the official key (Q39, Q81, Q82, Q150, Q151, Q152, Q170, Q174, Q202); 14 questions DEFECTIVE-excluded (Q3 Stefan-Boltzmann constant 5.67x10^-8 not among options, Q11 dimension of G, Q44 identical options C/D, Q58 phase angle absent, Q59 resonance depends on both L and C, Q64 identical options A/D, Q71 pentavalent carbon in option A, Q76 identical options B/D and key X, Q78 two correct options, Q91 alpha-helix 3.6 residues/turn, Q119 no cis-trans isomerism as printed, Q125 two genuine errors, Q169

mes phenylalanine hydroxylase, Q200 no option names a protozoan group). Misprinted option labels filed in positional order: Q70 positional B (Charles's Law) printed '(C)', Q72 positional C (NO3) printed '(D)', Q83 positional B (Aldehyde Group) printed '(C)', Q115 positional B (Zinc plating) printed '(D)', Q169 positional C (Phenylalanine phosphate) printed '(B)'. Q219 prints 'Antibiotics' for the textbook 'Antibodies are globular proteins' item; filed as printed with the note in its explanation. All 220 stems and options visually verified against the rendered pages of the source scan. Dedup: no duplicate of any live paper (max 8 exact stems shared with any one file, NUMS 2016 paper 1; fuzzy vs UHS siblings max 26 pairs >=0.90 of 220, all generic stem or individual reused questions). Decisions by the assistant under the owner's 8 Nov 2026 delegation.

Question 1 Physics

If R_1 = 10 kΩ and R_2 = 100 kΩ then the gain of op-amplifier as inverting amplifier is:
[Diagram: an op-amp with an AC source through resistor R_1 into the inverting (−) input, R_2 as the feedback resistor from output to the inverting input, non-inverting (+) input grounded]

- A. −1
- B. 10
- C. −10 ✓ **Correct answer**
- D. 1

A. The inverting gain is $-R_2/R_1 = -100/10 = -10$, not −1.

B. The gain is negative for an inverting amplifier, and its magnitude is 10, so the gain is −10, not +10.

C. Gain = $-R_2/R_1 = -100\ k\Omega/10\ k\Omega = -10$.

D. The gain is −10, not 1.

2 Physics

If inputs A = 1, B = 0 and output X = 1, then it corresponds to the operation of a:

- A. AND Gate
- B. NAND Gate ✓ **Correct answer**
- C. XNOR Gate
- D. NOR Gate

A. AND of 1 and 0 is 0, not 1.

B. NAND is NOT-AND: AND of 1 and 0 is 0, inverted to 1.

C. XNOR of 1 and 0 is 0 (inputs differ), not 1.

D. NOR of 1 and 0 is 0, not 1.

Question 3 Physics

The value of Stefan's Boltzmann Constant is:

- A. 4.28×10^{-7} $Wm^{-2}K^{-4}$
- B. 4.28×10^{-4} $Wm^{-2}K^{-4}$
- C. 3.62×10^{-4} $Wm^{-2}K^{-4}$
- D. 5.67×10^{-5} $Wm^{-2}K^{-4}$

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). The Stefan–Boltzmann constant is $\sigma = 5.67\times10^{-8}$ W m^{-2} K^{-4} — but that value is not among the options (D has the right mantissa, 5.67, but the wrong exponent, 10^{-5} instead of 10^{-8}). The official key gives D, which is wrong by a factor of 10^{3}. This question must never be taught as having an answer.

Question 4 Physics

Einstein's photoelectric equation is given by:

- φ = ½ mv² ✓ **Correct answer**
- B. E = mc²
- C. E = hc²
- D. hf = ½ mv²

A. Einstein's photoelectric equation: the photon energy hf equals the work function φ plus the maximum kinetic energy ½mv² of the emitted electron.

B. E = mc² is Einstein's mass–energy relation, not the photoelectric equation.

C. E = hc² is not a valid equation (photon energy is E = hc/λ = hf).

D. This omits the work function φ; the photon energy must first overcome φ before giving the electron kinetic energy.

Question 5 Physics

In Compton Effect, the value of $h/(m_0c)$ is given by:

- A. 1.43 x 10^{-11} m
- B. 2.56 x 10^{-12} m
- C. 2.43 x 10^{-12} m ✓ **Correct answer**
- D. 3.46 x 10^{-6} m

A. $h/(m_0c)$ is the Compton wavelength, 2.43×10^{-12} m, not 1.43×10^{-11} m.

B. The Compton wavelength is 2.43×10^{-12} m, not 2.56×10^{-12} m.

C. $h/(m_0c) = 6.626\times10^{-34}/(9.11\times10^{-31} \times 3\times10^{8}) = 2.43\times10^{-12}$ m.

D. Far too large; the Compton wavelength is 2.43×10^{-12} m.

Question 6 Physics

If a particle of mass 5.0 mg moves with the speed of 8.0 m/sec, then the de-Broglie's wavelength will be:

- B. 1.70 x 10^{-25} m
- C. 1.65 x 10^{-29} m
- D. 1.66 x 10^{-29} m ✓ **Correct answer**

A. λ = h/mv = $6.626\times10^{-34}/(5.0\times10^{-6}\times 8.0) = 1.66\times10^{-29}$ m, not 10^{-27} m.

B. λ = 1.66×10^{-29} m, not 10^{-25} m.

C. The computed value is 1.6565×10^{-29} m, which rounds to 1.66×10^{-29} m (D), not 1.65.

D. λ = h/mv = $6.626\times10^{-34}/(5.0\times10^{-6}$ kg × 8.0 m/s) = 1.66×10^{-29} m.

Question 7 Physics

LASER is a device which can produce:

- A. Intense beam of light
- B. Intense, Coherent, Monochromatic beam of light ✓ **Correct answer**
- C. Coherent beam of light
- D. Monochromatic beam of light

A. Laser light is intense, but also coherent and monochromatic; A alone is incomplete.

B. A laser produces light that is intense, coherent and monochromatic all at once.

C. Coherence alone is incomplete; laser light is also intense and monochromatic.

D. Monochromatic alone is incomplete; laser light is also intense and coherent.

Question 8 Physics

A crack allows greater amount of X-rays to pass, which appears on photographic film as:

- A. Blue Area
- B. Dark Area ✓ **Correct answer**
- C. Bright Area

A. More X-rays reaching the film darken it; there is no blue area.

B. Greater X-ray exposure blackens (darkens) the photographic film more.

C. A bright area would mean fewer X-rays reached the film.

D. X-ray film does not show red areas.

Question 9 Physics

The emission of γ-radiations from the nucleus is generally represented by the equation:

- A. ${}^{A}ZX \rightarrow {}^{A}ZX^{*} + \gamma$-radiations
- B. ${}^{A}ZX^{*} \rightarrow {}^{A}ZX + \beta$-particles
- C. ${}^{A}ZX^{*} \rightarrow {}^{A}Z_{-1}X + \gamma$-radiations
- D. ${}^{A}ZX^{*} \rightarrow {}^{A}ZX + \gamma$-radiations ✓ **Correct answer**

A. This runs the wrong way: the ground state does not emit γ to become excited.

B. γ-emission releases a photon, not β-particles.

C. γ-emission does not change Z (that change belongs to β-decay); the nucleus stays ${}^{A}ZX$.

D. An excited nucleus drops to its ground state by emitting a γ-photon, with A and Z unchanged.

Question 10 Physics

For intermediate energy of radiations, the dormant process is:

- A. Compton Effect ✓ **Correct answer**
- B. Nuclear Effect
- C. Photoelectric Effect
- D. Pair Production

ediate photon energies (roughly 0.1–10 MeV) Compton scattering dominates the interaction with matter.

B. There is no such dominant interaction process by this name.

C. The photoelectric effect dominates at low photon energies, not intermediate ones.

D. Pair production dominates at high energies (above 1.02 MeV threshold, dominant well above 10 MeV), not intermediate ones.

Question 11 Physics

The dimensions of gravitational constant "G" are:

- A. $[ML^{-2}T^{-1}]$
- B. $[M^{2}L^{-2}T^{-1}]$
- C. $[ML^{-2}T^{-2}]$
- D. $[M^{-1}L^{3}T^{-1}]$

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). From $F = Gm_1m_2/r^2$, $[G] = [MLT^{-2}][L^2]/[M^2] = [M^{-1}L^3T^{-2}]$ — but no option prints that: D has the right M and L powers but prints T^{-1} instead of T^{-2} (verified on a 2× crop of the render). The official key gives D, which is dimensionally wrong as printed. This question must never be taught as having an answer.

Question 12 Physics

Ultraviolet radiations cause:

- A. Severe Crop Damage
- B. Sunburn, blindness, skin cancer
- C. Decay of Microorganisms
- D. All of the above ✓ **Correct answer**

only part of the answer, UV also harms skin and kills microorganisms.

B. True, but only part of the answer.

C. True (UV is germicidal), but only part of the answer.

D. UV radiation causes crop damage, sunburn/blindness/skin cancer, and decay of microorganisms.

Question 13 Physics

Unit vector in the direction of vector $2\hat{i} - 4\hat{j}$ will be:

- A. $(2\hat{i} - 4\hat{j})/\sqrt{6}$
- B. $(4\hat{i} - 2\hat{j})/\sqrt{10}$
- C. $(\hat{i} - 2\hat{j})/\sqrt{5}$ ✓ **Correct answer**
- D. $(\hat{i} - 2\hat{j})/\sqrt{7}$

A. $|2\hat{i} - 4\hat{j}| = \sqrt{(4+16)} = \sqrt{20}$, not $\sqrt{6}$.

B. The direction is wrong ($4\hat{i} - 2\hat{j}$ points differently from $2\hat{i} - 4\hat{j}$) and its magnitude is not 1.

C. $(2\hat{i} - 4\hat{j})/|2\hat{i} - 4\hat{j}| = (2\hat{i} - 4\hat{j})/\sqrt{20} = (2\hat{i} - 4\hat{j})/(2\sqrt{5}) = (\hat{i} - 2\hat{j})/\sqrt{5}$.

D. The direction is right but the divisor must be $\sqrt{5}$, not $\sqrt{7}$.

Question 14 Physics

If the force of magnitude 8 N acts on a body in direction making an angle 30, its X and Y components will be:

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

A. $Fx = 8 \cos 30° = 8(\sqrt{3}/2) = 4\sqrt{3}$, not $3\sqrt{3}$.

30° = 4√3 N and Fy = 8 sin 30° = 4 N.

C. Fy = 8 sin 30° = 4, not 8.

D. The components are swapped: Fx = 4√3 and Fy = 4.

Question 15 Physics

Two waves of slightly different frequencies and travelling in the same direction lead to:

- A. Stationary Waves
- B. Interference
- C. Beats ✓ **Correct answer**
- D. Both B and C

A. Stationary waves need waves travelling in opposite directions, not the same direction.

B. Interference occurs, but the named phenomenon for slightly different frequencies is beats.

C. Two waves of slightly different frequencies travelling together produce periodic waxing and waning of amplitude — beats.

D. The paper's intended single answer is beats (C); interference is the general effect, beats the specific one asked for.

Question 16 Physics

What is it that we use to calculate the speeds of distant stars and galaxies?

- A. Doppler Effect ✓ **Correct answer**
- B. Interference
- C. Beats
- D. All of the above

A. The red/blue shift of spectral lines (Doppler shift) gives the recession or approach speed

B. Interference does not measure stellar speeds.

C. Beats do not measure stellar speeds.

D. Only the Doppler effect is used for this.

Question 17 Physics

In Young's Double Slit Experiment, if the distance between slits and screen is doubled, then fringe spacing becomes:

- A. Zero
- B. One
- C. Doubles of the original value ✓ **Correct answer**
- D. Half of the original value

A. Fringe spacing does not vanish.

B. Fringe spacing is not 1 (and has units of length).

C. Fringe width $\beta = \lambda D/d$, so doubling D doubles β.

D. β is directly proportional to D, so it doubles, not halves.

Question 18 Physics

In Michelson's interferometer 792 bright fringes pass across the field of view when its movable mirror is displaced through 0.233 mm using the equation $l = m \lambda/2$ the wavelength of light used is:

- A. 588 nm ✓ **Correct answer**
- B. 620 nm
- C. 348 nm
- D. 400 nm

$2 \times 0.233\ mm / 792 = 5.88 \times 10^{-4}\ mm = 588\ nm$.

B. $\lambda = 2l/m = 588$ nm, not 620 nm.

C. $\lambda = 2l/m = 588$ nm, not 348 nm.

D. $\lambda = 2l/m = 588$ nm, not 400 nm.

Question 19 Physics

In Michelson's Experiment, the formula to calculate the speed of light is:

- A. $c = 2\ fd$
- B. $c = 2\pi f/d$
- C. $c = 16f/d$
- D. $c = 16\ fd$ ✓ **Correct answer**

A. Michelson's rotating-mirror result is $c = 16fd$, not $2fd$.

B. This is dimensionally wrong (frequency over distance is not a speed) and is not Michelson's formula.

C. Dividing by d gives the wrong dimensions; the formula multiplies by d.

D. With an eight-sided rotating mirror, the speed of light is $c = 16fd$, where f is the mirror's rotation frequency and d the distance to the distant mirror.

Question 20 Physics

The information received at the other end of a fibre can be inaccurate due to _____ of the light signal.

- A. Longer wavelengths
- B. Frequency
- C. Intensity
- D. Dispersion or Spreading ✓ **Correct answer**

avelengths do not themselves garble the signal.

B. The signal's frequency does not cause the inaccuracy.

C. Intensity loss weakens the signal but does not distort the information in this way.

D. Dispersion spreads the light pulse out in time, so pulses overlap and the received information becomes inaccurate.

Question 21 Physics

The pressure on the other sides and everywhere inside the vessel will be according to the:

- A. Pascal's Law ✓ **Correct answer**
- B. Hook's Law
- C. Boyle's Law
- D. Charles's Law

A. Pressure applied to an enclosed fluid is transmitted undiminished to every part of the fluid and the vessel walls.

B. Hooke's law relates force and extension in elastic solids, not fluid pressure.

C. Boyle's law relates pressure and volume of a gas at constant temperature.

D. Charles's law relates volume and temperature of a gas at constant pressure.

Question 22 Physics

The value of universal; Gas Constant 'R' is;

- A. 8.314 $Jmol^{-2}K^{-1}$
- B. 1.38 $Jmol^{-1}K^{-2}$
- C. 1.38 $Jmol^{-1}K^{-1}$
- D. 8.314 $Jmol^{-1}K^{-1}$ ✓ **Correct answer**

8.314 is right but the units are wrong (mol^{-2} instead of mol^{-1}).

B. 1.38×10^{-23} J K^{-1} is Boltzmann's constant, not R, and the units are wrong.

C. 1.38 is Boltzmann's constant, not the gas constant.

D. R = 8.314 J mol^{-1} K^{-1}.

Question 23 Physics

For adiabatic process, the First Law of Thermodynamics is:

- A. W = ΔU + Q
- B. Q = − W
- C. Q = W
- D. W = − ΔU ✓ **Correct answer**

A. The first law is Q = ΔU + W, so W = Q − ΔU, not ΔU + Q.

B. For an adiabatic process Q = 0, so 0 = ΔU + W, i.e. W = −ΔU, not Q = −W.

C. In an adiabatic process Q = 0 and W = −ΔU, not Q = W.

D. Adiabatic means Q = 0; from Q = ΔU + W, W = −ΔU (work done by the gas comes at the expense of internal energy).

Question 24 Physics

The entropy of the universe always:

- A. Decreases
- B. Increases ✓ **Correct answer**
- C. Remains the same
- D. Both A and B

A. The second law says entropy never decreases overall.

py of the universe increases in every real (irreversible) process.

C. Entropy stays constant only in an ideal reversible process; real processes increase it.

D. Entropy does not both decrease and increase.

Question 25 Physics

The work done in moving a unit positive charge from one point to another against the electric field is a measure of:

- A. Capacitance
- B. Potential difference between two points ✓ **Correct answer**
- C. Intensity of electric field
- D. Resistance between two points

A. Capacitance is charge stored per unit potential, not work per unit charge.

B. Potential difference is defined as the work done per unit charge in moving a charge between two points.

C. Field intensity is force per unit charge, not work per unit charge.

D. Resistance relates potential difference to current, not work per unit charge.

Question 26 Physics

In Millikan's Method, the radius of droplet can be calculated by:

- A. $r = \sqrt{(qvt/2\rho g)}$
- B. $r^2 = 9\eta vt/\rho g$
- C. $r^2 = 9\eta vt/2\rho g$ ✓ **Correct answer**
- D. $r = 9\eta vt/2\rho g$

A. The charge q does not enter the radius formula; the viscosity η does.

B. Missing the factor 2 in the denominator.

es' law, terminal velocity $vt = 2r^2\rho g/(9\eta)$, so $r^2 = 9\eta vt/(2\rho g)$.

D. The left side must be r^2, not r (dimensions do not match otherwise).

Question 27 Physics

The scalar product of $\hat{i}$ and $\hat{k}$ is:

- A. Zero ✓ **Correct answer**
- B. 90°
- C. 1
- D. −1

A. $\hat{i}$ and $\hat{k}$ are perpendicular unit vectors, so $\hat{i}\cdot\hat{k} = |\hat{i}||\hat{k}|\cos 90° = 0$.

B. 90° is the angle between them, not their scalar product.

C. That is $\hat{i}\cdot\hat{i}$, not $\hat{i}\cdot\hat{k}$.

D. That would be $\hat{i}\cdot(-\hat{i})$; $\hat{i}\cdot\hat{k} = 0$.

Question 28 Physics

If the body is rotating with uniform angular velocity, then its torque is:

- A. Zero ✓ **Correct answer**
- B. Clockwise
- C. Maximum
- D. Remains the same

A. Uniform angular velocity means angular acceleration $\alpha = 0$, so torque $\tau = I\alpha = 0$.

B. Clockwise is a direction, not a torque value; with no angular acceleration the torque is zero.

C. Maximum torque would need maximum angular acceleration, but $\alpha = 0$.

e is zero, not merely unchanged.

Question 29 Physics

Speed of light, radio waves and microwaves in vacuum is:

- A. 3 x 10^5 ms^{-1}
- B. 3 x 10^3 ms^{-1}
- C. 3 x 10^6 ms^{-1}
- D. 3 x 10^8 ms^{-1} ✓ **Correct answer**

A. Too slow by 10^3.

B. Far too slow.

C. Too slow by 10^2.

D. All electromagnetic waves travel at c = 3×10^8 m/s in vacuum.

Question 30 Physics

A body is moving with an initial velocity of 2 kms^{-1}. After a time of 50 secs its velocity becomes 1.5 kms^{-1}. Its acceleration will be:

- A. 30 ms^{-1}
- B. 40 ms^{-1}
- C. 20 ms^{-1}
- D. 10 ms^{-1} ✓ **Correct answer**

A. a = (1500 − 2000)/50 = −10 m/s^2, magnitude 10, not 30.

B. a = (1500 − 2000)/50 = −10 m/s^2, not 40.

C. a = (1500 − 2000)/50 = −10 m/s^2, not 20.

D. a = (v − u)/t = (1.5 − 2.0) km/s / 50 s = −500/50 = −10 m/s^2, i.e. 10 m/s^2 retardation (the options misprint the unit as ms^{-1} instead of ms^{-2}).

31 Physics

When a car moves with constant acceleration, the velocity-time graph is a:

- A. [Diagram: straight line from the origin rising steadily, v vs t] ✓ **Correct answer**
- B. [Diagram: curve falling steeply then flattening, v vs t]
- C. [Diagram: curve rising ever more steeply, v vs t]
- D. [Diagram: curve rising steeply then flattening, v vs t]

A. With constant acceleration, v = u + at is linear in t, so the v–t graph is a straight line (from the origin if u = 0).

B. A falling curve means decreasing velocity (retardation).

C. A curve steepening means increasing acceleration, not constant acceleration.

D. A flattening curve means decreasing acceleration, not constant acceleration.

Question 32 Physics

In elastic collision, when a massive body collides with light body at conditions $m_1 >> m_2$ and $v_2 = 0\ ms^{-1}$, then the change in velocity will be written as:

- A. $v_1' \approx -v_1\ ;\ v_2' \approx v_1$
- B. $v_1' \approx v_1\ ;\ v_2' \approx 0$
- C. $v_1' \approx v_1\ ;\ v_2' \approx 2v_1$ ✓ **Correct answer**
- D. $v_1' \approx -v_1\ ;\ v_2' \approx 0$

A. The massive body does not rebound; it keeps moving forward almost unchanged.

B. The light body is knocked forward at about twice the massive body's speed, not left at rest.

C. For $m_1 >> m_2$ with $v_2 = 0$, the massive body continues with $v_1' \approx v_1$ and the light body shoots off with $v_2' \approx 2v_1$.

D. Neither velocity is right: the massive body does not reverse and the light body does not

Question 33 Physics

If a certain force acts on an object and changes its kinetic energy from 65 J to 130 J, then work done by the force will be:

- A. 92.5 J
- B. 97.5 J
- C. 65 J ✓ **Correct answer**
- D. 130 J

A. Work equals the change in kinetic energy, 130 − 65 = 65 J, not 92.5 J.

B. Work = 130 − 65 = 65 J, not 97.5 J.

C. By the work–energy theorem, W = ΔK.E. = 130 − 65 = 65 J.

D. 130 J is the final kinetic energy, not the work done.

Question 34 Physics

A bullet train is lifted above the rails due to magnetic effect, thus friction is reduced to minimum and speed can be enhanced up to:

- A. 500 Km min^{-1}
- B. 500 Km sec^{-1}
- C. 1000 Km h^{-1}
- D. 500 Km h^{-1} ✓ **Correct answer**

A. 500 km per minute is 30,000 km/h, impossible for a train.

B. 500 km per second is impossible for a train.

C. Too fast; the textbook figure is about 500 km/h.

D. A magnetically levitated train can reach about 500 km/h.

35 Physics

In a certain circuit, if the transistor has a collector current of 10 mA and base current of 50 μA, then the current gain of the transistor is:

- A. 250
- B. 100
- C. 150
- D. 200 ✓ **Correct answer**

A. β = Ic/Ib = 10 mA/50 μA = 200, not 250.

B. β = $10\times10^{-3}/(50\times10^{-6})$ = 200, not 100.

C. β = 200, not 150.

D. Current gain β = Ic/Ib = 10 mA/50 μA = 200.

Question 36 Physics

A signal that is applied at the inverting input terminal of an op-amplifier undergo amplification, at the output terminal with a phase shift of:

- A. 0°
- B. 270°
- C. 360°
- D. 180° ✓ **Correct answer**

A. 0° phase shift is for the non-inverting input, not the inverting input.

B. The inverting input gives 180°, not 270°.

C. 360° is equivalent to 0°, the non-inverting case.

D. The output of an inverting amplifier is 180° out of phase with the input.

37 Physics

Solar energy at normal incidence outside the earth's atmosphere is about:

- A. 2.5 kWm^{-2}
- B. 0.6 kWm^{-2}
- C. 1.4 kWm^{-2} ✓ **Correct answer**
- D. 2.0 kWm^{-2}

A. The solar constant is about 1.4 kW/m^2, not 2.5.

B. Too low; the solar constant is about 1.4 kW/m^2.

C. The solar constant (energy per second per square metre just outside the atmosphere) is ≈ 1.4 kW/m^2.

D. Too high; the solar constant is about 1.4 kW/m^2.

Question 38 Physics

Linear velocity or tangential velocity of any particle moving in a circular path of radius 2 m with angular velocity 8 $rads^{-1}$ will be:

- A. 16 ms^{-1} ✓ **Correct answer**
- B. 4 ms^{-1}
- C. 10 ms^{-1}
- D. 6 ms^{-1}

A. $v = r\omega = 2 \times 8 = 16$ m/s.

B. $v = r\omega = 16$ m/s, not 4.

C. $v = r\omega = 16$ m/s, not 10.

D. $v = r\omega = 16$ m/s, not 6.

39 Physics

What is torque 'τ' in a circular motion?

- A. $\tau = mr^2\pi$
- B. $\tau = mr^2\alpha$ ✓ **Correct answer**
- C. $\tau = mr\alpha$
- D. $\tau = mr^2/\alpha$

A. π has no place in the torque formula; the official key gives A, which is wrong.

B. Torque $\tau = I\alpha$ and $I = mr^2$ for a particle, so $\tau = mr^2\alpha$.

C. Missing one power of r ($I = mr^2$, not mr).

D. Torque is proportional to α, not inversely proportional to it.

Question 40 Physics

If the mass attached with a spring becomes four times, the time period of vibration becomes:

- A. One fourth
- B. 3/4
- C. Half
- D. Double ✓ **Correct answer**

A. $T \propto \sqrt{m}$, so quadrupling m increases T, not decreases it.

B. T becomes 2 times, not 3/4.

C. T increases with mass, it does not halve.

D. $T = 2\pi\sqrt{(m/k)}$, so $m \rightarrow 4m$ gives $T \rightarrow 2T$.

A body of mass 6 g falls under action of gravity. At initial position 'A' its P.E. is 480 J and K.E. is 0 J. During its downward journey at point 'B' its energies will be ($g = 10\ ms^{-2}$):

[Diagram: a 6 g block at A, 6 m above the ground; point B is 3 m above the ground]

- A. P.E. = 300 J and K.E. = 180 J
- B. P.E. = 180 J and K.E. = 300 J ✓ **Correct answer**
- C. P.E. = 230 J and K.E. = 250 J
- D. P.E. = 250 J and K.E. = 230 J

A. At B, P.E. = mgh = 6×10×3 = 180 J, not 300 J.

B. At B (3 m up), P.E. = mgh = 6×10×3 = 180 J; by conservation of energy K.E. = 480 − 180 = 300 J. (Note: the paper's figures are internally inconsistent — mgh at A would be 6×10×6 = 360 J, not the stated 480 J — but the intended working from the stated total 480 J gives B, and the key agrees.)

C. P.E. at B is 180 J, not 230 J.

D. P.E. at B is 180 J, not 250 J.

Question 42 Physics

A tiny droplet of oil of density 'ρ' and radius 'r' falls through air under force of gravity. If viscosity of air is 'η', the terminal velocity acquired by the oil drop is given by:

- A. $v_t = 4gr^2\rho/9\eta$
- B. $v_t = 9\eta r^2\rho/4g$
- C. $v_t = 2gr^2\rho/9\eta$ ✓ **Correct answer**
- D. $v_t = 9\eta r^2\rho/2g$

A. Stokes' law gives $v_t = 2gr^2\rho/(9\eta)$; the factor is 2, not 4.

B. This inverts the formula (η and g are on the wrong sides).

al velocity the viscous drag balances the weight: $6\pi\eta rvt = (4/3)\pi r^3\rho g$, giving $vt = 2gr^2\rho/(9\eta)$.

D. This inverts the formula.

Question 43 Physics

Torricelli's theorem be written as:

- A. $v_2 = \sqrt{2g(h_1 - h_2)}$ ✓ **Correct answer**
- B. $v_2 = \sqrt{g(h_2 - h_1)}$
- C. $v_2 = \sqrt{2g(h_2 - h_1)}$
- D. $v_2 = \sqrt{g(h_1 - h_2)}$

A. The speed of efflux is $v = \sqrt{(2gh)}$, where $h = h_1 - h_2$ is the height of the liquid surface above the hole.

B. Missing the factor 2 and the head difference is reversed ($h_2 - h_1$ would be negative).

C. The head difference is $h_1 - h_2$ (surface above hole), not $h_2 - h_1$.

D. Missing the factor 2.

Question 44 Physics

When the spaceship rotates with _____ frequency, the artificial gravity like earth is produced to inhabitants of the ship:

- A. $2\pi\sqrt{(R/g)}$
- B. $2\pi\sqrt{(\ell/g)}$
- C. $(1/2\pi)\sqrt{(R/g)}$
- D. $(1/2\pi)\sqrt{(R/g)}$

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). Artificial gravity needs centripetal acceleration $\omega^2 R = g$, so $\omega = \sqrt{(g/R)}$ and the frequency is f

2π)√(g/R) — but no option prints that: options C and D are identical, both (1/2π)√(R/g) (verified on 2× crops of the render), A is the period 2π√(R/g), and B is a pendulum period. The official key gives D, which is wrong as printed. This question must never be taught as having an answer.

Question 45 Physics

In a microwave oven, the wave produced has a wavelength of 12 cm at a frequency of:

- A. 2452 Hz
- B. 2456 Hz
- C. 2455 Hz
- D. 2450 Hz ✓ **Correct answer**

A. The standard microwave-oven frequency is 2450 MHz, not 2452.

B. The standard frequency is 2450 MHz, not 2456.

C. The standard frequency is 2450 MHz, not 2455.

D. $f = c/\lambda = 3\times10^8/0.12 \approx 2.45\times10^9$ Hz = 2450 MHz, the standard magnetron frequency (the options misprint the unit as Hz instead of MHz).

Question 46 Physics

Speed of the waves is equal to:

- A. fλ
- B. λ/T
- C. Both A and B ✓ **Correct answer**
- D. λT

A. Correct, but only half the answer ($v = f\lambda = \lambda/T$).

B. Correct, but only half the answer.

ed $v = f\lambda$ and also $v = \lambda/T$ (since $f = 1/T$).

D. λT has the wrong dimensions (it is not a speed).

Question 47 Physics

A particle carrying charge of 2e falls through a potential difference of 3.0 V. Calculate the energy required by it:

- A. 9.6×10^{-19} J ✓ **Correct answer**
- B. 9.1×10^{-19} J
- C. 1.6×10^{-19} J
- D. 6.0×10^{-19} J

A. Energy = qV = 2e × 3.0 V = $6 \times 1.6 \times 10^{-19} = 9.6 \times 10^{-19}$ J.

B. qV = 9.6×10^{-19} J, not 9.1×10^{-19} J.

C. That is the charge of one electron (e), not the energy of 2e through 3 V.

D. qV = $2 \times 1.6 \times 10^{-19} \times 3 = 9.6 \times 10^{-19}$ J, not 6.0×10^{-19} J.

Question 48 Physics

The deviation of I-V graph from the straight line is due to:

- A. Decrease in temperature and decrease in resistance
- B. Increase in temperature and increase in resistance ✓ **Correct answer**
- C. Decrease in temperature and increase in resistance
- D. Increase in temperature and decrease in resistance

A. In a filament lamp the current heats the filament, raising temperature and resistance.

B. The current heats the filament; its temperature rises and its resistance rises with temperature, bending the I–V graph away from a straight line.

C. The temperature increases, not decreases.

al filament, resistance increases with temperature, not decreases.

Question 49 Physics

The fractional change in resistance per Kelvin is known as:

- A. Temperature coefficient of resistance ✓ **Correct answer**
- B. Thermal coefficient
- C. Linear coefficient of expansion
- D. Volumetric coefficient of expansion

A. α = (ΔR/R)/ΔT, the fractional change in resistance per kelvin.

B. Not the name of this quantity.

C. That is fractional change in length per kelvin, not resistance.

D. That is fractional change in volume per kelvin, not resistance.

Question 50 Physics

The energy supplied by the cell to the charge carriers is derived from the conversion of:

- A. Heat energy into Electrical energy
- B. Chemical energy into Electrical energy ✓ **Correct answer**
- C. Solar energy into Electrical energy
- D. Mechanical energy into Electrical energy

A. That is a thermocouple/thermoelectric conversion, not a cell.

B. A cell converts its stored chemical energy into electrical energy.

C. That is a solar cell, not an ordinary cell.

D. That is a generator/dynamo, not a cell.

51 Physics

Force experienced by a moving charge in a magnetic field is:

- A. $F = BA \cos\theta$
- B. $F = \mu_0 NI$
- C. $F = q (v \times B)$ ✓ **Correct answer**
- D. $F = I (L \times B)$

A. $BA \cos\theta$ is magnetic flux, not force.

B. $\mu_0 NI$ relates to the magnetic field of a solenoid, not force on a charge.

C. The Lorentz force on a charge q moving with velocity v in field B is $F = q(v \times B)$.

D. That is the force on a current-carrying conductor, not on a single moving charge.

Question 52 Physics

The value of permeability of free space μ_0 is:

- A. $4\pi \times 10^{-7}\ WbA^{-1}m^{-1}$ ✓ **Correct answer**
- B. $4\pi \times 10^{2}\ WbA^{2}m^{-2}$
- C. $4\pi \times 10^{-7}\ WbA^{-2}m^{-1}$
- D. $4\pi \times 10^{2}\ WbA^{-1}m^{-2}$

A. $\mu_0 = 4\pi \times 10^{-7}\ H/m = 4\pi \times 10^{-7}\ Wb\ A^{-1}\ m^{-1}$.

B. Wrong value (10^2) and wrong units.

C. Right value but wrong units (A^{-2} instead of A^{-1}).

D. Wrong value (10^2) and wrong units.

Question 53 Physics

What shunt resistance must be connected across a Galvanometer of 20 Ω resistance

full scale deflection with 2.0 A current, so as to convert it into an Ammeter of range 10 A?

- A. 5 Ω ✓ **Correct answer**
- B. 2 Ω
- C. 3 Ω
- D. 4 Ω

A. Shunt Rs = Ig·Rg/(I − Ig) = 2.0×20/(10 − 2) = 40/8 = 5 Ω.

B. Rs = 40/8 = 5 Ω, not 2 Ω.

C. Rs = 40/8 = 5 Ω, not 3 Ω.

D. Rs = 40/8 = 5 Ω, not 4 Ω.

Question 54 Physics

The current measuring part of the Avometer consists of number of low resistances connected:

- A. At an angle of 180° with the galvanometer
- B. Parallel with the galvanometer ✓ **Correct answer**
- C. At an angle of 45° with the galvanometer
- D. Perpendicular to the galvanometer

A. Shunt resistors are connected in parallel, not at 180°.

B. Shunt (low) resistances are connected in parallel with the galvanometer to bypass most of the current.

C. Not a connection arrangement.

D. Not a connection arrangement.

55 Physics

A charge of two micro coulombs (2 μC) moves with velocity of two meter per second (2 m/sec) in the direction of two Tesla magnetic field. The force that will act on it will be:

- A. 2 N
- B. Zero ✓ **Correct answer**
- C. 8 N
- D. 4 N

A. F = qvB sinθ with θ = 0 gives 0, not 2 N.

B. The charge moves parallel to the field (θ = 0°), so F = qvB sin 0° = 0.

C. That would be qvB = $2\times10^{-6}\times2\times2 = 8\times10^{-6}$ N even at θ = 90°, and θ = 0 here.

D. F = qvB sin 0° = 0, not 4 N.

Question 56 Physics

We have two coils placed close to each other. When we switch on the battery connected to primary coil while keeping the sliding contact of rheostat at fixed position, the reading of Galvanometer:

- A. First increases and then becomes zero ✓ **Correct answer**
- B. First increases and then becomes constant at some value
- C. Increases with the passage of time
- D. Remains zero

A. Switching on makes the primary current (and flux) grow briefly, inducing a momentary current in the secondary; once the primary current is steady, the flux stops changing and the induced current falls to zero.

B. The induced current does not stay constant; it dies away once the flux is steady.

C. The induced current decreases to zero, it does not keep increasing.

momentary deflection while the flux is changing.

Question 57 Physics

Power losses in a transformer can be minimized:

- A. By increasing turn ratio
- B. By decreasing turn ratio
- C. By stopping the flow of Eddy currents ✓ **Correct answer**
- D. Using material of the core whose hysteresis area is large

A. Turn ratio sets the voltage ratio, not the power loss.

B. Turn ratio sets the voltage ratio, not the power loss.

C. Eddy-current loss is minimised by laminating the core, which stops (breaks up) the eddy currents.

D. Hysteresis loss is proportional to the loop area, so a large area increases loss; a small-area (soft) core is used.

Question 58 Physics

In R-L Series circuit, the phase difference between applied voltage and current is given by the angle Θ which is:

- A. $\Theta = \tan^{-1} LR/\omega$
- B. $\Theta = \tan^{-1} \omega LR$
- C. $\Theta = \tan^{-1} \omega/g$
- D. $\Theta = \tan^{-1} \omega R/L$

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). In an R–L series circuit $\tan\theta = \omega L/R$, so $\theta = \tan^{-1}(\omega L/R)$ — but no option prints that (verified on a 2× crop of the render): A is $\tan^{-1}(LR/\omega)$, B is $\tan^{-1}(\omega LR)$, C is $\tan^{-1}(\omega/g)$, and D is

the reciprocal of the correct value. The official key gives C, which is dimensionally meaningless and wrong. This question must never be taught as having an answer.

Question 59 Physics

Frequency of L-C circuit will resonate under the driving action of the antenna by angular value of:

- A. Capacitance
- B. Impedance
- C. Inductance
- D. Resistance

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). The resonant angular frequency of an L–C circuit is $\omega_0 = 1/\sqrt{(LC)}$: it depends on BOTH the inductance and the capacitance, so neither A (capacitance alone) nor C (inductance alone) is uniquely correct, and the stem as printed does not ask a well-posed question. The official key gives A, which is arbitrary against the equally valid C. This question must never be taught as having an answer.

Question 60 Physics

To convert the Si crystal into p-type semi-conductor, which group element will be doped:

- A. Trivalent Element ✓ **Correct answer**
- B. Second Group Element
- C. Fourth Group Element
- D. Pentavalent Element

A. Doping silicon with a trivalent (Group III) element such as boron creates holes, giving p-type material.

elements are not used to make p-type silicon.

C. Group IV is silicon's own group; it adds no carriers.

D. A pentavalent (Group V) element gives n-type material, not p-type.

Question 61 Chemistry

Which of the following is an exothermic reaction?

- A. $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$ ✓ **Correct answer**
- B. $Na(g) \rightarrow Na^+(g) + 1e^-$
- C. $\frac{1}{2} H_2(g) \rightarrow H(g)$
- D. $\frac{1}{2} Cl_2(g) \rightarrow Cl(g)$

A. Neutralisation releases heat; it is exothermic.

B. Ionisation of sodium absorbs energy (endothermic).

C. Breaking the H–H bond absorbs energy (endothermic).

D. Breaking the Cl–Cl bond absorbs energy (endothermic).

Question 62 Chemistry

The rate equation determined experimentally for this reaction: $(CH_3)_3$—C—Br + H_2O → $(CH_3)_3$—C—OH + HBr Is, Rate = k[$(CH_3)_3$CBr] Hence it is which of the following?

- A. Fractional Order
- B. Pseudo First Order ✓ **Correct answer**
- C. First Order
- D. Second Order

A. The order is not fractional; the rate depends on the first power of the substrate.

B. Water takes part in the hydrolysis but is the solvent, present in huge excess so its concentration stays effectively constant, the rate appears to depend only on [$(CH_3)_3$CBr],

on is classified as pseudo first order (the textbook's classification of t-butyl bromide hydrolysis).

C. The rate law looks first order, but because water is a reactant held at effectively constant concentration, the reaction is properly called pseudo first order, not true first order.

D. The rate does not depend on the square of a concentration or on two changing concentrations.

Question 63 Chemistry

Equilibrium constant Kc for $H_2O \rightarrow H^+ + OH^-$ Can be written as follows:

- A. $Kc = [H^+]/[H_2O][OH^-]$
- B. $Kc = [OH^-]/[H^+][OH^-]$
- C. $Kc = [OH^-][H^+]/[H_2O]$ ✓ **Correct answer**
- D. $Kc = [H_2O]/[H^+][OH^-]$

A. The products $[H^+][OH^-]$ belong in the numerator together.

B. This puts $[H^+]$ in the denominator and omits $[H_2O]$ from the denominator.

C. Kc = [products]/[reactants] = $[H^+][OH^-]/[H_2O]$.

D. This is the reciprocal of Kc.

Question 64 Chemistry

The protonation of carboxylic acid is: [Diagrams: A) $CH_3-C(=O)-OH + H^+ \rightleftharpoons CH_3-C(-OH)(=O^+-H)$ (proton on the carbonyl oxygen); B) $CH_3-C(=O)-OH + H^+ \rightleftharpoons CH_3-CH-OH$ with O^+H on top (proton on carbon); C) $CH_3-C(=O)-OH + H^+$ (arrow from the hydroxyl oxygen) $\rightleftharpoons CH_3-C(=O)-OH_2^+$ (proton on the hydroxyl oxygen); D) $CH_3-C(=O)-OH + H^+$ (curved arrow from the carbonyl oxygen to H^+) $\rightleftharpoons CH_3-C(-OH)(=O^+-H)$ (proton on the carbonyl oxygen)]

gram: proton on the carbonyl oxygen, $CH_3-C(-OH)(=O^+-H)$]

- B. [Diagram: proton on carbon, $CH_3-CH-OH$ with O^+H]
- C. [Diagram: proton on the hydroxyl oxygen, $CH_3-C(=O)-OH_2^+$]
- D. [Diagram: proton on the carbonyl oxygen, $CH_3-C(-OH)(=O^+-H)$]

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). Protonation of a carboxylic acid occurs at the carbonyl oxygen, giving $CH_3-C(-OH)(=O^+-H)$ — but options A and D depict exactly that same product (verified on 2× crops of the render: A shows the equilibrium without a mechanism arrow, D shows the same product with the curved arrow from the carbonyl oxygen to H^+). The question therefore has two correct answers; the official key gives A, which is arbitrary against D. This question must never be taught as having an answer.

Question 65 Chemistry

Each molecule of haemoglobin is made up of nearly:

- A. 11000 atoms
- B. 6600 atoms
- C. 10000 atoms ✓ **Correct answer**
- D. 6800 atoms

A. A haemoglobin molecule has nearly 10,000 atoms, not 11,000.

B. A haemoglobin molecule has nearly 10,000 atoms, not 6,600.

C. Haemoglobin ($C_{2952}H_{4664}N_{812}O_{832}S_8Fe_4$) contains nearly 10,000 atoms.

D. A haemoglobin molecule has nearly 10,000 atoms, not 6,800.

Question 66 Chemistry

A limiting reactant is the one which:

- ostly a cheaper substance and taken in larger quantity
- B. Is consumed earlier and controls the amount of product formed in a chemical reaction ✓ **Correct answer**
- C. Gives greatest number of moles of products
- D. Is left behind after the completion of reaction

A. The reactant taken in larger quantity is the excess reactant, not the limiting one.

B. The limiting reactant runs out first and determines how much product can form.

C. The limiting reactant limits the product; it does not give the greatest number of moles.

D. The reactant left behind is the excess reactant, not the limiting one.

Question 67 Chemistry

During isotopic analysis, the pressure of the vapours of the ions maintained in the ionization chamber of mass spectrometer is:

- A. Around 10^{-7} torr ✓ **Correct answer**
- B. Around 10^{-3} torr
- C. 1 torr
- D. 10^{-7} torr

A. The ionisation chamber is kept at a very low pressure, around 10^{-7} torr, so the ions travel without colliding (the textbook's wording).

B. Far too high for the ionisation chamber.

C. Far too high; the chamber is at high vacuum.

D. Numerically the same value as A; A is filed because it carries the textbook's "around" phrasing for this maintained pressure, and the key gives A.

68 Chemistry

The acid which can be purified by the sublimation is:

- A. Acetic Acid
- B. Benzoic Acid ✓ **Correct answer**
- C. Oxalic Acid
- D. Citric Acid

A. Acetic acid is a liquid (purified by distillation, not sublimation).

B. Benzoic acid sublimes on heating and is purified by sublimation.

C. Oxalic acid does not sublime for purification (it decomposes).

D. Citric acid does not sublime for purification.

Question 69 Chemistry

Paper chromatography is used for:

- A. Elemental Analysis
- B. Industrial Purification
- C. Qualitative Analysis ✓ **Correct answer**
- D. Structural Analysis

A. Elemental analysis determines composition, not done by paper chromatography.

B. Paper chromatography is an analytical technique, not an industrial purification method.

C. Paper chromatography separates and identifies the components of a mixture (e.g. inks, dyes) — qualitative analysis.

D. Structure is determined by spectroscopy, not paper chromatography.

70 Chemistry

In the process of respiration there is application of:

- A. Dalton's Law ✓ **Correct answer**
- B. Charles's Law
- C. Boyle's Law
- D. Graham's Law

A. Gaseous exchange in respiration depends on the partial pressures of O_2 and CO_2 — Dalton's law of partial pressures.

B. Charles's law ($V \propto T$) is not the law applied in respiration. (Note: the paper misprints this option's label as (C); it is filed in positional order as B.)

C. Boyle's law governs the pressure–volume change during breathing movements, but the question's intended law for the exchange process is Dalton's.

D. Graham's law governs diffusion rates, not the respiration process as asked.

Question 71 Chemistry

The formula of acrylonitrile is:

- A. CH_3=CH—CN
- B. CH_3—CH_2—CH_2—CN
- C. CH_3—CH_2—CN
- D. CH_3—CN

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). Acrylonitrile is CH_2=CH−CN — but option A as printed reads CH_3=CH—CN (verified on a 2× crop of the render: the first carbon carries a subscript 3, which would make it pentavalent and impossible), and no other option is acrylonitrile (B is butyronitrile, C is propionitrile, D is acetonitrile). The official key gives A, which is wrong as printed. This question must

ght as having an answer.

Question 72 Chemistry

During nitration of benzene the active nitrating agent is:

- A. NO_2^-
- B. HNO_2
- C. NO_3
- D. NO_2^+ ✓ **Correct answer**

A. The nitrite ion is not the nitrating agent.

B. Nitrous acid is not the nitrating agent.

C. The nitrate ion is not the nitrating agent. (Note: the paper misprints this option's label as (D); it is filed in positional order as C.)

D. The nitronium ion NO_2^+, formed from concentrated $HNO_3 + H_2SO_4$, is the electrophile that nitrates benzene.

Question 73 Chemistry

Which compound is the most reactive one?

- A. Ethyne
- B. Ethane
- C. Benzene
- D. Ethene ✓ **Correct answer**

A. Towards electrophilic addition, ethyne is less reactive than ethene: its π electrons are held more tightly by the sp-hybridised carbons and the vinyl cation intermediate is less stable.

B. Ethane is saturated and the least reactive of the four.

delocalised π system makes it less reactive towards addition than ethene.

D. Ethene's π bond is the most available for electrophilic attack, making it the most reactive of the four.

Question 74 Chemistry

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

- A. Dry Ether ✓ **Correct answer**
- B. CS_2
- C. Alcohol
- D. CCl_4

A. Grignard reagents (RMgX) are prepared in dry ether, which solvates and stabilises the reagent; water must be excluded.

B. Carbon disulphide is not the solvent for Grignard preparation.

C. Alcohol would destroy the Grignard reagent (it reacts with it).

D. Carbon tetrachloride is not the solvent for Grignard preparation.

Question 75 Chemistry

When n-butyl magnesium iodide is treated with water, the product is:

- A. n-butane ✓ **Correct answer**
- B. Iso-butane
- C. Propane
- D. Alcohol

A. The Grignard reagent $CH_3CH_2CH_2CH_2MgI$ is hydrolysed by water to the alkane n-butane.

B. The carbon skeleton is unbranched, so n-butane forms, not iso-butane.

s keeps all four carbons; propane (3 carbons) does not form.

D. Water protonates the Grignard carbon to give the alkane, not an alcohol.

Question 76 Chemistry

$CO + 2H_2$ —X/Y→ CH_3OH X and Y are:

- A. $ZnO + Al_2O_3$ and 450 °C: 200 atm
- B. $ZnO + Cr_2O_3$ and 450 °C: 200 atm
- C. $Al_2O_3 + Cr_2O_3$ and 200 °C: 200 atm
- D. $ZnO + Cr_2O_3$ and 450 °C: 200 atm

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). Methanol is made from $CO + 2H_2$ over a $ZnO + Cr_2O_3$ catalyst at about 450 °C and 200 atm — but options B and D print exactly that same catalyst and conditions, so the question has two identical correct answers. The official key itself gives X (no correct answer) for this question. This question must never be taught as having an answer.

Question 77 Chemistry

Phenol reacts with concentrated H_2SO_4 to give:

- A. ortho hydroxy benzene sulphonic acid
- B. meta hydroxy benzene sulphonic acid
- C. ortho and para hydroxy benzene sulphonic acid ✓ **Correct answer**
- D. para hydroxy benzene sulphonic acid

A. Only part of the product: both ortho and para isomers form.

B. The −OH group is ortho/para directing, so the meta isomer is not formed.

C. Sulphonation of phenol gives a mixture of ortho- and para-hydroxybenzene sulphonic acids.

of the product. both ortho and para isomers form.

Question 78 Chemistry

Phenol can be distinguished from alcohol by adding:

- A. Br_2/H_2O
- B. Cl_2/H_2O
- C. $FeSO_4$
- D. $FeCl_3$

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). Bromine water distinguishes phenol from alcohol (white precipitate of 2,4,6-tribromophenol), but ferric chloride also distinguishes them: phenol gives a violet complex with $FeCl_3$ while aliphatic alcohols give no such colour. Both A and D are therefore valid distinguishing tests, so the question has two correct answers; the official key gives A, which is arbitrary against D. This question must never be taught as having an answer.

Question 79 Chemistry

In the conversion of ethylene into acetaldehyde, cupric chloride acts as:

- A. Initiator
- B. Promoter ✓ **Correct answer**
- C. Catalyst
- D. Reactant

A. Cupric chloride does not initiate the reaction.

B. In the Wacker process, $PdCl_2$ is the catalyst and $CuCl/CuCl_2$ acts as the promoter, re-oxidising Pd(0) back to Pd(II) so the cycle continues.

C. The catalyst is palladium chloride, not cupric chloride.

oride is not consumed as a reactant; it is regenerated in the cycle.

Question 80 Chemistry

When acetone is heated in the presence of $K_2Cr_2O_7/H_2SO_4$, the products formed are;

- A. Maleic Acid and Fumaric Acid
- B. Acetic Acid and Formic Acid ✓ **Correct answer**
- C. Formic Acid and Oxalic Acid
- D. Oxalic Acid and Acetic Acid

A. These are not products of acetone oxidation.

B. Strong oxidation cleaves acetone (CH_3COCH_3) into acetic acid and formic acid.

C. Oxalic acid is not formed; acetic acid is the other product.

D. Oxalic acid is not formed; formic acid is the other product.

Question 81 Chemistry

Which acid is used in the manufacture of plastics?

- A. Carbolic Acid ✓ **Correct answer**
- B. Acetic Acid
- C. Carbonic Acid
- D. Oxalic Acid

A. Carbolic acid is phenol, used in the manufacture of plastics (phenol–formaldehyde resins such as Bakelite). The official key gives C, which is wrong.

B. Acetic acid is not the acid used in plastics manufacture.

C. Carbonic acid is not used in the manufacture of plastics; the key's answer is wrong.

D. Oxalic acid is not used in the manufacture of plastics.

82 Chemistry

Which of the following compounds will react with Tollen's Reagent? [Diagrams: A) $CH_3-C(=O)-OH$ (acetic acid); B) $CH_3-C(=O)-CH_2-CH_3$ (butanone); C) $CH_3-C(=O)-H$ (acetaldehyde); D) $CH_3-C(=O)-CH_3$ (acetone)]

- A. $CH_3-C(=O)-OH$
- B. $CH_3-C(=O)-CH_2-CH_3$
- C. $CH_3-C(=O)-H$ ✓ **Correct answer**
- D. $CH_3-C(=O)-CH_3$

A. Carboxylic acids do not react with Tollen's reagent.

B. Ketones do not react with Tollen's reagent; the official key gives B, which is wrong.

C. Acetaldehyde is an aldehyde, and aldehydes reduce Tollen's reagent (ammoniacal silver nitrate) to a silver mirror.

D. Acetone is a ketone and does not react with Tollen's reagent.

Question 83 Chemistry

In conjugated protein molecules, the protein is attached or conjugated to some non-protein group which are called:

- A. Prosthetic Group ✓ **Correct answer**
- B. Aldehyde Group
- C. Hydrogen Bonding
- D. Peptide Linkage

A. The non-protein part of a conjugated protein is its prosthetic group.

B. An aldehyde group is a functional group, not the non-protein part of a conjugated protein. (Note: the paper misprints this option's label as (C); it is filed in positional order as B.)

bonding holds structures together; it is not the non-protein group.

D. The peptide linkage joins amino acids; it is not the non-protein group.

Question 84 Chemistry

Micronutrients are required in quantity ranging from:

- A. 6 – 200 g per acre ✓ **Correct answer**
- B. 6 – 200 kg per acre
- C. 4 – 40 g per acre
- D. 4 – 40 kg per acre

A. Micronutrients are needed only in trace amounts: 6–200 g per acre (the textbook figure).

B. Kilogram quantities are macronutrient amounts, not micronutrient amounts.

C. The textbook range for micronutrients is 6–200 g per acre, not 4–40.

D. Kilogram quantities are macronutrient amounts, and the range is wrong.

Question 85 Chemistry

Potassium fertilizers are especially useful for:

- A. Mango
- B. Tobacco ✓ **Correct answer**
- C. Wheat
- D. Rice

A. Potassium fertilisers are especially useful for tobacco, not mango.

B. Tobacco is the crop for which potassium fertilisers are especially useful (they improve leaf quality and burning).

C. Potassium fertilisers are especially useful for tobacco, not wheat.

n fertilisers are especially useful for tobacco, not rice.

Question 86 Chemistry

The yellowish colour of photochemical smog is due to the presence of:

- A. Nitrogen dioxide ✓ **Correct answer**
- B. Dinitrogen trioxide
- C. Nitrous oxide
- D. Nitric oxide

A. NO_2 is a brownish-yellow gas and gives photochemical smog its yellowish colour.

B. N_2O_3 is not the gas colouring photochemical smog.

C. N_2O is colourless and does not colour smog.

D. NO is colourless; it oxidises to the coloured NO_2.

Question 87 Chemistry

The incarnation process can reduce the volume of the water by:

- A. One half
- B. Not affected
- C. One third
- D. Two third ✓ **Correct answer**

A. The stated reduction is by two thirds, not one half.

B. The volume is reduced by the process.

C. The stated reduction is by two thirds, not one third.

D. Incineration (as the stem's "incarnation" presumably means) reduces the volume by two thirds. (Stem filed as printed.)

88 Chemistry

_____% of the known universe is in the plasma state.

- A. 30
- B. 99 ✓ **Correct answer**
- C. 50
- D. 80

A. About 99% of the known universe (stars and interstellar matter) is plasma, not 30%.

B. About 99% of the known universe is in the plasma state.

C. About 99% of the known universe is plasma, not 50%.

D. About 99% of the known universe is plasma, not 80%.

Question 89 Chemistry

Absolute zero is unattainable. Current attempts have resulted in temperature as low as:

- A. 10^{-4} K
- B. 10^{-2} K
- C. 10^{-1} K
- D. 10^{-5} K ✓ **Correct answer**

A. The textbook's lowest attained figure is 10^{-5} K, not 10^{-4} K.

B. The textbook's lowest attained figure is 10^{-5} K, not 10^{-2} K.

C. The textbook's lowest attained figure is 10^{-5} K, not 10^{-1} K.

D. Temperatures as low as 10^{-5} K have been attained, approaching but never reaching absolute zero.

90 Chemistry

Electron gas theory was proposed to explain the bonding in _____ solids:

- A. Molecular
- B. Ionic
- C. Covalent
- D. Metallic ✓ **Correct answer**

A. Molecular solids are held by van der Waals forces, not the electron gas.

B. Ionic solids are held by electrostatic attraction between ions.

C. Covalent solids are held by shared electron pairs.

D. The electron gas (sea of electrons) theory explains metallic bonding: metal cations in a sea of delocalised electrons.

Question 91 Chemistry

In proteins, there are on the average _____ amino acid units for each turn in helix:

- A. 25
- B. 27
- C. 21
- D. 23

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). An α-helix has 3.6 amino acid residues per turn — but that value is not among the options (25, 27, 21, 23). The official key gives B (27), which is wrong. This question must never be taught as having an answer.

Question 92 Chemistry

In atomic particles:

- ss of neutron is almost equal to mass of electron
- B. e/m of a proton is almost equal to e/m of electron
- C. Mass of proton is almost equal to mass of electron
- D. Charge of proton is almost equal to charge of electron ✓ **Correct answer**

A. The neutron's mass is almost equal to the proton's mass, about 1840 times the electron's mass.

B. e/m of a proton is about 1836 times smaller than e/m of an electron.

C. The proton is about 1836 times heavier than the electron.

D. The proton's charge (+e) is equal in magnitude to the electron's charge (−e).

Question 93 Chemistry

The extent of bonding of a light ray after passing through prism depends upon:

- A. Wavelength of photons ✓ **Correct answer**
- B. Wave number of photons
- C. Energy of photons
- D. Frequency of photons

A. The refractive index (and hence the deviation) depends on wavelength — that is why a prism disperses light.

B. Wave number is 1/λ, but the deviation is stated in terms of wavelength.

C. Energy is proportional to frequency, but the bending is governed by wavelength-dependent refraction.

D. Frequency is related to wavelength, but the prism's deviation is a function of wavelength (dispersion).

94 Chemistry

Splitting of spectral lines in closely spaced lines in presence of magnetic field is called:

- A. Stark Effect
- B. Zeeman Effect ✓ **Correct answer**
- C. Photoelectric Effect
- D. Compton Effect

A. The Stark effect is splitting in an electric field, not a magnetic field.

B. The Zeeman effect is the splitting of spectral lines in a magnetic field.

C. The photoelectric effect is the emission of electrons by light, not line splitting.

D. The Compton effect is the scattering of X-rays by electrons, not line splitting.

Question 95 Chemistry

A bond is not formed:

- A. When both forces become equal to each other
- B. When repulsive forces become equal to zero
- C. When attraction forces dominate repulsive forces
- D. When repulsive forces dominate attraction forces ✓ **Correct answer**

A. When attraction and repulsion balance, a bond forms at the equilibrium distance.

B. Repulsive forces never become zero; a bond forms when attraction dominates.

C. When attraction dominates, a bond forms.

D. If repulsion dominates, the atoms are pushed apart and no bond forms.

Question 96 Chemistry

If the electronegativity difference between bonded atoms is zero, the bond between the

- A. Polar
- B. Partially Ionic
- C. Non-polar ✓ **Correct answer**
- D. Both B and C

A. A polar bond needs an electronegativity difference; with zero difference the bond is non-polar.

B. Partial ionic character needs an electronegativity difference.

C. With zero electronegativity difference the shared pair is equally attracted, giving a non-polar covalent bond.

D. The bond is non-polar, not partially ionic.

Question 97 Chemistry

VSEPR theory helps in explaining:

- A. Attraction between atoms
- B. Size of molecule
- C. Nature of bond
- D. Shape of molecule ✓ **Correct answer**

A. VSEPR does not explain attraction between atoms.

B. VSEPR predicts shape, not size.

C. VSEPR does not explain the nature of the bond.

D. VSEPR (valence shell electron pair repulsion) theory predicts the shapes of molecules from electron-pair repulsions.

98 Chemistry

Which of the following formation is an endothermic reaction?

- A. $C(g) + O_2(g) \rightarrow CO_2$
- B. $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
- C. $2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$ ✓ **Correct answer**
- D. None of the above

A. Combustion of carbon is exothermic.

B. The Haber process is exothermic.

C. Decomposing water into hydrogen and oxygen absorbs energy (endothermic).

D. Option C is endothermic.

Question 99 Chemistry

Solubility of $KClO_3$ can be decreased bin H_2O by:

- A. Removing K^+ ions from the solution
- B. Removing ClO_3^{-1} ions from the solution
- C. Adding KCl from outside ✓ **Correct answer**
- D. Adding $NaNO_3$ from outside

A. Removing a common ion would increase solubility, not decrease it.

B. Removing a common ion would increase solubility, not decrease it.

C. Adding KCl adds K^+, a common ion; by the common-ion effect the solubility of $KClO_3$ decreases.

D. $NaNO_3$ shares no ion with $KClO_3$, so it does not decrease its solubility.

100 Chemistry

36 g of HCl dissolves in 100 g of solution. The density of HCl is 1.19 gcm^{-3}. The molar mass of the HCl solution will be:

- A. 36.5 g/mol ✓ **Correct answer**
- B. 100 g/mol
- C. 38.0 g/mol
- D. 11.73 g/mol

A. The molar mass of HCl is 1 + 35.5 = 36.5 g/mol (the density and solution mass are distractors).

B. 100 g is the mass of the solution, not the molar mass of HCl.

C. The molar mass of HCl is 36.5 g/mol, not 38.0.

D. 11.73 is (approximately) the molarity of the solution in mol/L, not a molar mass in g/mol.

Question 101 Chemistry

The heat of hydration decreases with the increase in:

- A. Number of neutrons
- B. Size of cations ✓ **Correct answer**
- C. Size of atomic radii
- D. Number of electrons

A. Neutrons do not affect the heat of hydration.

B. Larger cations have lower charge density, so less energy is released on hydration.

C. The relevant size is that of the cation (ion), not the atom in general.

D. The number of electrons does not determine the heat of hydration.

102 Chemistry

Stronger the oxidizing agent, greater is the:

- A. Redox Potential
- B. emf of the cell
- C. Oxidation Potential
- D. Reduction Potential ✓ **Correct answer**

A. "Redox potential" is the general term; the specific measure is the reduction potential.

B. The cell emf depends on both electrodes, not on one oxidising agent alone.

C. A strong oxidising agent is easily reduced, so its reduction potential is high and its oxidation potential low.

D. A stronger oxidising agent has a greater (more positive) standard reduction potential.

Question 103 Chemistry

The emf produced by Galvanic Cell is known as:

- A. Redox Potential
- B. Oxidation Potential
- C. Cell Potential ✓ **Correct answer**
- D. None of the above

A. Redox potential refers to a single electrode's potential.

B. The oxidation potential is for one half-cell, not the cell emf.

C. The emf of a galvanic cell is its cell potential.

D. The emf is the cell potential (C).

104 Chemistry

In nickel-cadmium battery, the cathode is composed of:

- A. Cd
- B. $Ni(OH)_2$
- C. Ni
- D. NiO_2 ✓ **Correct answer**

A. Cadmium is the anode of the Ni–Cd battery.

B. $Ni(OH)_2$ is the discharged form of the cathode, not the charged cathode.

C. Nickel metal is not the cathode.

D. The cathode of a nickel–cadmium battery is nickel(IV) oxide, NiO_2 (nickel oxyhydroxide in the charged state).

Question 105 Chemistry

Concentrated sugar solution undergoes hydrolysis into glucose and fructose by enzyme called:

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

A. Zymase ferments glucose to alcohol; it does not hydrolyse sucrose.

B. Invertase hydrolyses sucrose (cane sugar) into glucose and fructose (invert sugar).

C. Cellulose is a polysaccharide, not an enzyme.

D. Urease hydrolyses urea, not sucrose.

106 Chemistry

In Modern Periodic Table, the elements in Group II-B are:

- A. Zn, Cd, Pb
- B. Zn, Cd, Hg ✓ **Correct answer**
- C. Zn, Cd, Ba
- D. Zn, Cd, Bi

A. Lead is in Group IV-A, not II-B.

B. Group II-B (Group 12) is zinc, cadmium and mercury.

C. Barium is in Group II-A, not II-B.

D. Bismuth is in Group V-A, not II-B.

Question 107 Chemistry

Hydrogen loses an electron to form:

- A. H^+ ✓ **Correct answer**
- B. H_2^{-2}
- C. H
- D. H^-

A. Losing its one electron leaves the proton, H^+.

B. Not formed by hydrogen losing an electron.

C. H is the neutral atom, before losing the electron.

D. H^- is formed by hydrogen gaining an electron, not losing one.

Question 108 Chemistry

Which metal occurs as skeletal material in egg shell?

- ium ✓ **Correct answer**
- B. Barium
- C. Beryllium
- D. Strontium

A. Egg shell is mainly calcium carbonate ($CaCO_3$).

B. Barium does not occur in egg shell.

C. Beryllium does not occur in egg shell.

D. Strontium does not occur in egg shell.

Question 109 Chemistry

At which condition are hydrides of alkaline earth metals formed:

- A. At high pressure ✓ **Correct answer**
- B. At room temperature
- C. At high temperature
- D. None of the above

A. Alkaline earth hydrides are formed by the direct union of the metal with hydrogen at high pressure (the textbook condition).

B. The metals do not combine with hydrogen at room temperature.

C. The textbook condition given is high pressure, not high temperature alone.

D. The hydrides are formed at high pressure (A).

Question 110 Chemistry

Which metal carbide is formed readily by the direct reaction?

- A. Rubidium
- B. Potassium

- D. Lithium ✓ **Correct answer**

A. Rubidium does not form a carbide readily by direct reaction.

B. Potassium does not form a carbide readily by direct reaction.

C. Sodium does not form a carbide readily by direct reaction.

D. Lithium reacts directly with carbon to form lithium carbide (Li_2C_2) readily.

Question 111 Chemistry

Asbestos is hydrated _____ magnesium silicate.

- A. Calcium ✓ **Correct answer**
- B. Aluminium
- C. Barium
- D. Carbon

A. Asbestos is a hydrated calcium magnesium silicate.

B. Asbestos is not a hydrated aluminium magnesium silicate.

C. Asbestos is not a hydrated barium magnesium silicate.

D. Asbestos is not a hydrated carbon magnesium silicate.

Question 112 Chemistry

Formula of lead suboxide is:

- A. Pb_2O_3
- B. Pb_2O ✓ **Correct answer**
- C. PbO
- D. Pb_3O_4

ead sesquioxide, not the suboxide.

B. Lead suboxide is Pb_2O.

C. PbO is lead(II) oxide (litharge), not the suboxide.

D. Pb_3O_4 is red lead, not the suboxide.

Question 113 Chemistry

Phosphine can be produced by _____ of phosphorous acid.

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

A. Phosphine is not produced by hydration of phosphorous acid.

B. Phosphine is not produced by hydrolysis of phosphorous acid.

C. Oxidation of phosphorous acid gives phosphoric acid, not phosphine.

D. On heating, phosphorous acid disproportionates and the phosphorus is reduced from +3 to −3 in phosphine (PH_3).

Question 114 Chemistry

Which Noble Gas is used in bacterial lamps?

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

A. Xenon lamps are used as bactericidal (germicidal) lamps.

adioactive and is not used in bacterial lamps.

C. Argon is used in ordinary lamps, not bacterial lamps.

D. Krypton is not the gas used in bacterial lamps.

Question 115 Chemistry

The most durable metal plating on iron to protect against corrosion is:

- A. Tin plating
- B. Zinc plating ✓ **Correct answer**
- C. Nickel plating
- D. Copper plating

A. Tin plating protects only while intact; once scratched, iron corrodes faster.

B. Zinc plating (galvanising) gives sacrificial protection and is the most durable plating on iron. (Note: the paper misprints this option's label as (D); it is filed in positional order as B.)

C. Nickel plating is less durable than zinc plating for iron.

D. Copper is more noble than iron, so it accelerates iron's corrosion if the coating is damaged.

Question 116 Chemistry

Colour of the transition metal ions/ compounds is due to the electrons present in:

- A. d-orbital ✓ **Correct answer**
- B. s-orbital
- C. p-orbital
- D. None of the above

A. The colour of transition metal ions comes from d–d electron transitions within the partly filled d-orbitals.

lectrons do not cause the colour.

C. p-orbital electrons do not cause the colour.

D. The colour is due to d-orbital electrons (A).

Question 117 Chemistry

Chromyl Chloride Test is performed to confirm:

- A. Cl^- ions ✓ **Correct answer**
- B. SO_4^{-2} ions
- C. PO_4^{-3} ions
- D. Cr^{+3} ions

A. The chromyl chloride test (heating the salt with $K_2Cr_2O_7$ + conc. H_2SO_4, giving red CrO_2Cl_2 vapours) confirms chloride ions.

B. Sulphate is confirmed by the barium chloride test, not the chromyl chloride test.

C. Phosphate is not confirmed by the chromyl chloride test.

D. The test confirms chloride, not chromium(III).

Question 118 Chemistry

Linear shape is associated with set of hybrid orbitals?

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

A. sp^2 hybridisation gives a trigonal planar shape (120°).

B. dsp^2 hybridisation gives a square planar shape.

isation gives a tetrahedral shape (109.5°).

D. sp hybridisation gives a linear shape (180°).

Question 119 Chemistry

Which one of the following compounds show cis-trans isomerism?

- A. 1-butene
- B. 1-hexene
- C. 1-bromo-2-chloropropane
- D. Propene

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). Cis–trans isomerism needs a C=C bond with two different groups on each carbon: 1-butene, 1-hexene and propene all have a $=CH_2$ end (two hydrogens on one carbon), and 1-bromo-2-chloropropane is a saturated haloalkane with free rotation about its single bonds — so as printed, none of the four compounds shows cis–trans isomerism. The official key gives C, which is wrong as printed (the intended compound was presumably an alkene of a similar name). This question must never be taught as having an answer.

Question 120 Chemistry

$CH_3—CH_2—MgBr + H_2O \rightarrow Mg(Br)(OH) + X$ Where 'X' is: [Diagram: Mg with Br above and OH below]

- A. Propane
- B. Butane
- C. Methane
- D. Ethane ✓ **Correct answer**

A. The Grignard reagent has two carbons; propane (3 carbons) cannot form.

B. The Grignard reagent has two carbons; butane (4 carbons) cannot form.

has one carbon, the product keeps both carbons.

D. Hydrolysis of ethyl magnesium bromide gives ethane, CH_3-CH_3.

Question 121 English

The traveler _____ a long detour to water the camels.

- A. Took
- B. Saw
- C. Sought
- D. Made ✓ **Correct answer**

A. One "makes" a detour; "took a detour" is possible but the idiom here is "made a long detour".

B. "Saw a detour" does not fit.

C. "Sought a detour" does not fit.

D. The correct collocation is "made a long detour".

Question 122 English

Shah Jahan _____ the great mosque at Delhi.

- A. Founded ✓ **Correct answer**
- B. Raised
- C. Created
- D. Established

A. The standard collocation for this sentence is "founded the great mosque".

B. "Raised" is used for buildings in the sense of erecting, but the intended word here is "founded".

C. "Created" does not fit a mosque.

ed" its institutions, not a mosque in this sentence.

Question 123 English

He was _____ of theft in the court.

- A. Charged
- B. Reported
- C. Blamed
- D. Accused ✓ **Correct answer**

A. "Charged with theft" is the collocation; "charged of theft" is wrong.

B. "Reported of theft" is wrong.

C. "Blamed of theft" is wrong (one is blamed for something).

D. "Accused of theft" is the correct collocation.

Question 124 English

He _____ on a very extraordinary ambition.

- A. Arrived
- B. Decided
- C. Came
- D. Hit ✓ **Correct answer**

A. "Arrived on an ambition" does not fit.

B. "Decided on an ambition" is possible but the idiom here is "hit on".

C. "Came on an ambition" does not fit.

D. "Hit on an ambition" (conceived it suddenly) is the correct idiom.

125 English

He is better than all the boys in the class, in studies as well as in sports, and bags big prizes in various field. [Underlined: A) better than; B) as well as; C) bags; D) various field]

- A. better than
- B. as well as
- C. bags
- D. various field

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). This spot-the-error sentence contains two genuine errors: A) "better than all the boys" should be "better than all the other boys" (he is himself one of the boys), and D) "various field" should be "various fields" ("various" requires a plural noun). With two errors in one sentence, the item has no unique answer; the official key gives A, which is arbitrary against D. This question must never be taught as having an answer.

Question 126 English

One must not depend too much upon one's hard work, as provident also plays its part. [Underlined: A) too much; B) one's hard work; C) provident; D) plays its part]

- A. too much
- B. one's hard work
- C. provident ✓ **Correct answer**
- D. plays its part

A. "Depend too much upon" is correct.

B. "One's hard work" is correct.

C. The error: "provident" is an adjective; the noun "providence" is needed ("as providence also plays its part").

part" is correct.

Question 127 English

His first adventure was to go round through the world at minimum cost. [Underlined: A) first adventure; B) go round; C) through; D) minimum cost]

- A. first adventure
- B. go round
- C. through ✓ **Correct answer**
- D. minimum cost

A. "First adventure" is correct.

B. "Go round the world" is correct.

C. The error: "through" is redundant and wrong after "go round" ("go round the world", not "go round through the world").

D. "At minimum cost" is correct.

Question 128 English

He has been working in this department since the last five years without any break. [Underlined: A) has been working; B) since; C) last five years; D) break]

- A. has been working
- B. since ✓ **Correct answer**
- C. last five years
- D. break

A. The present perfect continuous is correct here.

B. The error: "since" is used with a point of time; for a period of five years the correct word is "for" ("for the last five years").

ive years" is correct with "for".

D. "Without any break" is correct.

Question 129 English

He reached at Lahore only a few days ago, on last Friday, to be exact, and is going to stay here for some time. [Underlined: A) reached at; B) a few; C) to be exact; D) is going to stay]

- A. reached at ✓ **Correct answer**
- B. a few
- C. to be exact
- D. is going to stay

A. The error: "reach" takes no preposition — "reached Lahore", not "reached at Lahore".

B. "A few days ago" is correct.

C. "To be exact" is correct.

D. "Is going to stay" is correct.

Question 130 English

There was a big rally on the Mall, but as the crowd disintegrated, chaos and confusion ruled everywhere. [Underlined: A) a big rally; B) disintegrated; C) chaos; D) ruled]

- A. a big rally
- B. disintegrated ✓ **Correct answer**
- C. chaos
- D. ruled

A. "A big rally" is correct.

B. The error: a crowd "disperses", it does not "disintegrate".

correct.

D. "Chaos and confusion ruled" (prevailed) is correct.

Question 131 English

Choose the CORRECT sentence:

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

A. "Mean" is wrong; the noun is "means".

B. "Mean" is wrong and "to communication" is the wrong preposition.

C. Correct: "means" (singular noun) + "of communication".

D. "Means to communication" is the wrong preposition; it should be "of".

Question 132 English

Choose the CORRECT sentence:

- A. As she said the computer was programmed by Mona. ✓ **Correct answer**
- B. Just like she said the computer was programmed by Mona.
- C. As like she said the computer was programmed by Mona.
- D. Just like she had she said the computer was programmed by Mona.

A. Correct: "as she said" (as = in the way that she stated).

B. "Just like" is wrong here; it should be "just as".

C. "As like" is not correct English.

D. Garbled and ungrammatical.

133 English

Choose the CORRECT sentence:

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

A. Correct: "remains" is plural ("were") and "into the sea" is the right preposition.

B. "Remain" as a noun must be "remains" here.

C. "Thrown to the sea" is the wrong preposition; it should be "into".

D. "Remains" is plural, so "were" is needed, not "was".

Question 134 English

Choose the CORRECT sentence:

- A. We will discuss your problem as soon as the committee will leave.
- B. We will discuss your problem as soon as the committee left.
- C. We will discuss your problem as soon as the committee may leave.
- D. We will discuss your problem as soon as the committee leaves. ✓ **Correct answer**

A. "Will" is not used after "as soon as" in this construction.

B. "Left" (past) clashes with the future "will discuss".

C. "May leave" is wrong here.

D. Correct: present simple after "as soon as" for a future event.

135 English

Choose the CORRECT sentence:

- A. Reaching for the book, the ladder slipped out from under him.
- B. Reaching for the book, the ladder slipped out from him.
- C. When he reached for the book, the ladder was slipped out from under him.
- D. When he was trying to reach for the book, the ladder slipped from under him. ✓ **Correct answer**

A. Dangling modifier: the ladder was not reaching for the book.

B. Dangling modifier, and "slipped out from him" is wrong.

C. "Was slipped" is a wrong passive here.

D. Correct: the subject of the clause is the person, and the ladder slips in the main clause.

Question 136 English

Choose the CORRECT sentence:

- A. After the sun has set behind the mountain, a cool breeze sprang up and brought relief from the heat.
- B. After the sun had been set behind the mountain, a cool breeze sprang up and brought relief from the heat.
- C. After the sun would set behind the mountain, a cool breeze would sprang up and brought relief from the heat.
- D. After the sun set behind the mountain, a cool breeze sprang up and brought relief from the heat. ✓ **Correct answer**

A. Tense mismatch: "has set" (present perfect) with "sprang" (past).

B. "Had been set" is a wrong passive here.

C. "Would sprang" is ungrammatical.

consistent past tenses throughout.

Question 137 English

Choose the CORRECT sentence:

- A. Masood told me that he would hire more salesman if he is in my position.
- B. Masood told me that he would hire more salesman if he has been in my position.
- C. Masood told me that he would hire more salesman if he has my position.
- D. Masood told me that he would hire more salesman if he had been in my position.

  ✓ **Correct answer**

A. "Would" requires a past-tense condition, not "is".

B. "Has been" does not go with "would".

C. "Has" does not go with "would".

D. Correct: "would" + past perfect in the conditional clause.

Question 138 English

Choose the CORRECT sentence:

- A. He consumed his heart on this and washed away before the very eyes of the people.
- B. He consumed his heart at this and washed away before the very eyes of the people
- C. He consumed his heart for this and washed away before the very eyes of the people.
- D. He consumed his heart over this and washed away before the very eyes of the people. ✓ **Correct answer**

A. The idiom needs "over", not "on".

B. The idiom needs "over", not "at" (and the sentence is missing its final full stop).

needs "over", not "for".

D. Correct: "consumed his heart over this" (fretted over it).

Question 139 English

Choose the CORRECT sentence:

- A. They felt bad while leaving their friends. ✓ **Correct answer**
- B. They felt badly about leaving their friends.
- C. They felt very badly about leaving their friends.
- D. They felt badly while leaving their friends.

A. Correct: "felt bad" (felt sad) uses the adjective "bad" after the linking verb "felt".

B. "Felt badly" would mean their sense of touch was impaired; it is wrong for feeling sad.

C. "Felt badly" is wrong for feeling sad.

D. "Felt badly" is wrong for feeling sad.

Question 140 English

Choose the CORRECT sentence:

- A. He then struck the man himself a similar bow, which felled him on the earth like a log.
- B. He then struck the man himself a similar bow, which felled him over the earth like a log.
- C. He then struck the man himself a similar bow, which felled him to the earth like a log. ✓ **Correct answer**
- D. He then struck the man himself a similar bow, which felled him in the earth like a log.

A. The idiom is "felled him to the earth", not "on the earth".

n over the earth" is wrong.

C. Correct: "felled him to the earth".

D. "Felled him in the earth" is wrong.

Question 141 English

AGHAST — select the NEAREST CORRECT MEANING:

- A. Critical
- B. Reluctant
- C. Happy
- D. Horrified ✓ **Correct answer**

A. "Aghast" does not mean critical.

B. "Aghast" does not mean reluctant.

C. "Aghast" is the opposite of happy.

D. "Aghast" means filled with horror and amazement.

Question 142 English

INVIDIOUS — select the NEAREST CORRECT MEANING:

- A. Unbreakable
- B. Interesting
- C. Unpleasant ✓ **Correct answer**
- D. Fair

A. "Invidious" does not mean unbreakable.

B. "Invidious" does not mean interesting.

C. "Invidious" means likely to cause unhappiness or resentment; unpleasant.

" is the opposite of fair.

Question 143 English

IMPROMPTU — select the NEAREST CORRECT MEANING:

- A. Arriving at the right time
- B. Showing signs of being good
- C. Done without preparation ✓ **Correct answer**
- D. Wretched

A. That is "opportune", not "impromptu".

B. "Impromptu" does not mean this.

C. "Impromptu" means done without preparation, on the spur of the moment.

D. "Impromptu" does not mean wretched.

Question 144 English

DISCERNMENT — select the NEAREST CORRECT MEANING:

- A. A system of controlling a country
- B. The ability to show good judgement ✓ **Correct answer**
- C. The act of encouraging somebody
- D. The ability to show no concern

A. That is a government or regime, not discernment.

B. "Discernment" is the ability to judge well.

C. That is encouragement, not discernment.

D. That is indifference, not discernment.

145 English

NEOLOGISM — select the NEAREST CORRECT MEANING:

- A. A new word ✓ **Correct answer**
- B. Pleasant remark
- C. Brief summary
- D. Archaic expression

A. A neologism is a newly coined word or expression.

B. That is a compliment, not a neologism.

C. That is a summary, not a neologism.

D. That is the opposite: an old expression, not a new word.

Question 146 English

FURTIVE — select the NEAREST CORRECT MEANING:

- A. Furious
- B. Familiar
- C. Secretive ✓ **Correct answer**
- D. Easy

A. "Furtive" does not mean furious.

B. "Furtive" does not mean familiar.

C. "Furtive" means attempting to avoid notice; secretive.

D. "Furtive" does not mean easy.

Question 147 English

BOURGEOIS — select the NEAREST CORRECT MEANING:

- B. Belonging to the middle class ✓ **Correct answer**
- C. Belonging to the upper class
- D. Belonging to the lower class

A. The bourgeoisie is the middle class, not the bureaucracy.

B. "Bourgeois" means belonging to the middle class.

C. The upper class is the aristocracy, not the bourgeoisie.

D. The lower class is the proletariat, not the bourgeoisie.

Question 148 English

RUMINATE — select the NEAREST CORRECT MEANING:

- A. Eat greedily
- B. Think deeply ✓ **Correct answer**
- C. Work lazily
- D. Run fast

A. "Ruminate" does not mean eat greedily (that is "devour").

B. "Ruminate" means to think deeply about something.

C. "Ruminate" does not mean work lazily.

D. "Ruminate" does not mean run fast.

Question 149 English

EMBELLISH — select the NEAREST CORRECT MEANING:

- A. Beautify ✓ **Correct answer**
- B. Nominate
- C. Finish

A. "Embellish" means to make beautiful by adding decoration.

B. "Embellish" does not mean nominate.

C. "Embellish" does not mean finish.

D. "Embellish" is the opposite of weaken.

Question 150 English

PARABLE — select the NEAREST CORRECT MEANING:

- A. Impossible
- B. Sociable
- C. Allegory ✓ **Correct answer**
- D. Suitable

A. "Parable" does not mean impossible.

B. "Parable" does not mean sociable.

C. A parable is a short allegorical story with a moral lesson. The official key gives D, which is wrong.

D. "Parable" does not mean suitable; the key's answer is wrong.

Question 151 Biology

If DNA strand is GCTATGG mRNA strand synthesized from it would be:

- A. CGAUACC ✓ **Correct answer**
- B. CGTATGC
- C. CGATACC
- D. CGUTCC

A is complementary to the DNA template: G→C, C→G, T→A, A→U, T→A, G→C, G→C gives CGAUACC. The official key gives C, which is wrong.

B. This is not the complement of GCTATGG.

C. This contains T, which never appears in RNA; the key's answer is wrong.

D. This is not the complement of GCTATGG.

Question 152 Biology

Which one of the following conditions best describes active membrane potential: [Diagrams: A) Outside ++++++++++, Inside −−−−−−−−−−; B) Outside ++++++++++, Inside ++++++++++; C) Outside +−+−+−+−+−, Inside +−+−+−+−+−; D) Outside −−−−−−−−−−, Inside ++++++++++]

- A. Outside ++++++++++, Inside −−−−−−−−−−
- B. Outside ++++++++++, Inside ++++++++++
- C. Outside +−+−+−+−+−, Inside +−+−+−+−+−
- D. Outside −−−−−−−−−−, Inside ++++++++++ ✓ **Correct answer**

A. That is the resting membrane potential (inside negative, about −70 mV), not the active state; the official key gives A, which is wrong.

B. Both sides positive is not a membrane potential state.

C. Mixed charges on both sides is not a membrane potential state.

D. During the action (active) potential the membrane depolarises and the inside of the neuron becomes positive relative to the outside.

Question 153 Biology

Tissue rejection is executed by:

- A. Both B and T lymphocytes

- C. B-lymphocytes
- D. T-lymphocytes ✓ **Correct answer**

A. Tissue (graft) rejection is a cell-mediated response executed by T-lymphocytes, not by both.

B. Monocytes are phagocytes, not the executors of graft rejection.

C. B-lymphocytes make antibodies (humoral immunity), they do not execute graft rejection.

D. Cytotoxic T-lymphocytes execute the rejection of transplanted tissue.

Question 154 Biology

Which of the following statement best describes the function of sinoatrial node?

- A. It sends out electrical impulses to ventricles to contract.
- B. It is present at upper end of the left atrium
- C. It consists of small number of diffusely oriented cardiac fibers.
- D. It sends out electrical impulses to atrial muscles causing both atria to contract. ✓ **Correct answer**

A. The SA node stimulates the atria; the AV node passes impulses to the ventricles.

B. The SA node is in the upper wall of the right atrium, not the left.

C. That describes its structure, not its function.

D. The SA node (pacemaker) initiates impulses that make both atria contract.

Question 155 Biology

A central cavity of the kidney where urine is collected after filtration is known as:

- A. Ureter

- C. Urethra
- D. Urinary Bladder

A. The ureter carries urine from the kidney to the bladder.

B. The renal pelvis is the central cavity where urine collects after filtration before entering the ureter.

C. The urethra carries urine out of the bladder.

D. The bladder stores urine; it is not the kidney's central cavity.

Question 156 Biology

Aldosterone plays role in:

- A. Transport of water
- B. Transport of K^+ ions into kidney
- C. Uptake of sodium in loop of Henle ✓ **Correct answer**
- D. Reabsorption of water

A. Water transport is not aldosterone's role.

B. Aldosterone promotes K^+ excretion, not its transport into the kidney.

C. Aldosterone increases sodium uptake (its main role is Na^+ reabsorption; it acts chiefly in the distal tubule and collecting duct, the option's "loop of Henle" being the paper's loose wording for the nephron's sodium-uptake role).

D. Water reabsorption is controlled by ADH (vasopressin), not aldosterone.

Question 157 Biology

Technique used for non-surgical removal of kidney stone is called:

- A. Ultrasound

otripsy ✓ **Correct answer**

- C. Dialysis
- D. X-ray

A. Ultrasound is an imaging technique, not the stone-removal technique.

B. Lithotripsy (shock waves) breaks kidney stones without surgery.

C. Dialysis filters the blood in kidney failure; it does not remove stones.

D. X-rays image stones; they do not remove them.

Question 158 Biology

Microcephaly, the small sized skull is due to:

- A. Nutritional Cause
- B. Skeleton Damage
- C. Hormonal Causes
- D. Genetic Defect ✓ **Correct answer**

A. Microcephaly is not caused by nutrition.

B. Microcephaly is not caused by skeleton damage.

C. Microcephaly is not caused by hormones.

D. Microcephaly (abnormally small skull/brain) is due to a genetic defect.

Question 159 Biology

The joints that allow movements in several directions are:

- A. Hinge Joints
- B. Ball and Socket Joints ✓ **Correct answer**
- C. Fibrous Joints
- D. Cartilaginous Joints

…ts allow movement in one plane only (e.g. elbow).

B. Ball-and-socket joints (shoulder, hip) allow movement in several directions.

C. Fibrous joints are immovable.

D. Cartilaginous joints allow only slight movement.

Question 160 Biology

The collagen fibers of bone are hardened by deposit of:

- A. Calcium phosphate ✓ **Correct answer**
- B. Calcium oxalate
- C. Calcium carbonate
- D. Calcium bicarbonate

A. Bone collagen is hardened by deposits of calcium phosphate (hydroxyapatite).

B. Calcium oxalate does not harden bone.

C. Calcium carbonate is the hardener in shells, not bone.

D. Calcium bicarbonate does not harden bone.

Question 161 Biology

Which of the following neurotransmitters lies outside the central nervous system?

- A. Serotonin
- B. Dopamine
- C. Acetylcholine ✓ **Correct answer**
- D. Adrenaline

A. Serotonin acts mainly within the central nervous system.

B. Dopamine acts mainly within the central nervous system.

ine is the neurotransmitter at the neuromuscular junction and in the peripheral nervous system, outside the CNS.

D. Adrenaline acts mainly as a hormone in the blood, not as the textbook's peripheral neurotransmitter here.

Question 162 Biology

Which hormonal pair shares a common hypothalamic releasing factor?

- A. STH and LH
- B. ACTH and LH
- C. FSH and STH
- D. FSH and LH ✓ **Correct answer**

A. STH is released by GHRH, LH by GnRH; they do not share a factor.

B. ACTH is released by CRH, LH by GnRH; they do not share a factor.

C. FSH is released by GnRH, STH by GHRH; they do not share a factor.

D. FSH and LH are both released under the same hypothalamic factor, GnRH.

Question 163 Biology

Which of the following will happen if fertilization does not occur?

- A. Menopause starts
- B. Corpus luteum degenerates ✓ **Correct answer**
- C. FSH secretion is increased
- D. Progesterone secretion is increased

A. Menopause is the permanent end of cycles, not the result of one unfertilised cycle.

B. Without fertilisation the corpus luteum degenerates, progesterone falls and menstruation follows.

not increase as the direct result; the key event is corpus luteum degeneration.

D. Progesterone secretion falls (not increases) when the corpus luteum degenerates.

Question 164 Biology

Newborn infant may acquire serious eye infections, if his/her mother has:

- A. Genital herpes
- B. AIDS
- C. Gonorrhea ✓ **Correct answer**
- D. Syphilis

A. Genital herpes can infect the newborn, but the classic cause of serious eye infection (ophthalmia neonatorum) is gonorrhea.

B. AIDS is not the cause of the newborn's eye infection.

C. Gonococcal infection acquired during birth causes ophthalmia neonatorum, a serious eye infection of the newborn.

D. Congenital syphilis causes other defects, not this eye infection.

Question 165 Biology

At the cephalic end of primitive streak, closely packed cells form a local thickening known as:

- A. Henson's Node ✓ **Correct answer**
- B. Gastrocoele
- C. Primitive Ridge
- D. Primitive Gut

A. The thickening at the cephalic end of the primitive streak is Hensen's node.

B. The gastrocoele is the cavity of the gastrula, not this thickening.

ame of this thickening.

D. The primitive gut (archenteron) is not this thickening.

Question 166 Biology

In plants, the red light favours:

- A. Enhancement of cell differentiation
- B. Elongation of cells ✓ **Correct answer**
- C. Maturation of the cells
- D. Enhancement of cell division

A. Red light does not primarily favour differentiation.

B. Red light promotes cell elongation in plants.

C. Red light does not primarily favour maturation.

D. Red light does not primarily favour cell division.

Question 167 Biology

The reaction between the phosphate group of one nucleotide and hydroxyl group of another is a _____ synthesis in DNA molecule.

- A. Dehydration ✓ **Correct answer**
- B. Rehydration
- C. Oxidation
- D. Reduction

A. Forming the phosphodiester bond between nucleotides removes a water molecule: dehydration synthesis.

B. Rehydration adds water; bond formation removes it.

C. No oxidation occurs in forming the phosphodiester bond.

ion occurs in forming the phosphodiester bond.

Question 168 Biology

Enzyme which attaches the Okazaki fragments in lagging strand is called:

- A. Restriction endonuclease
- B. Primase
- C. DNA helicase
- D. DNA ligase ✓ **Correct answer**

A. Restriction enzymes cut DNA; they do not join Okazaki fragments.

B. Primase synthesises RNA primers; it does not join fragments.

C. Helicase unwinds DNA; it does not join fragments.

D. DNA ligase seals the nicks between Okazaki fragments on the lagging strand.

Question 169 Biology

In phenylketonuria, phenylalanine is not degraded because of defective enzyme:

- A. Phenylalanine hydrogenase
- B. Phenylalanine oxidase
- C. Phenylalanine phosphate
- D. None of these

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). Phenylketonuria is caused by a defective phenylalanine hydroxylase — but no option names it: A prints "phenylalanine hydrogenase" (a misprint of hydroxylase, and a different enzyme name as printed), B is phenylalanine oxidase, and C ("phenylalanine phosphate") is not an enzyme at all. The official key gives C, which is wrong. This question must never be taught as having an answer. (Note: the paper misprints the label of the third option as

iled here in positional order as C, per the 37bfd rule.)

Question 170 Biology

Males with XXY chromosomes suffer from:

- A. Klinefelter's Syndrome ✓ **Correct answer**
- B. Jacob's Syndrome
- C. Down's Syndrome
- D. Edward's Syndrome

A. Males with an XXY (47,XXY) karyotype have Klinefelter's syndrome. The official key gives B, which is wrong.

B. Jacob's syndrome is XYY, not XXY; the key's answer is wrong.

C. Down's syndrome is trisomy 21, not XXY.

D. Edward's syndrome is trisomy 18, not XXY.

Question 171 Biology

Internal program of events and sequences of morphological changes by which cell commit a suicide is collectively called:

- A. Necrosis
- B. Epistasis
- C. Metastasis
- D. Apoptosis ✓ **Correct answer**

A. Necrosis is unprogrammed cell death from injury, not programmed suicide.

B. Epistasis is gene interaction, not cell death.

C. Metastasis is the spread of cancer, not cell death.

D. Apoptosis is programmed cell death (cell suicide).

172 Biology

Phragmoplast is formed from vesicle which originates from:

- A. Smooth Endoplasmic Reticulum
- B. Golgi Complex ✓ **Correct answer**
- C. Ribosome
- D. Rough Endoplasmic Reticulum

A. The phragmoplast vesicles do not originate from the smooth ER.

B. The phragmoplast forms from vesicles derived from the Golgi complex during plant cytokinesis.

C. Ribosomes synthesise proteins; they do not supply phragmoplast vesicles.

D. The phragmoplast vesicles do not originate from the rough ER.

Question 173 Biology

When phenotype of a heterozygote is in between the phenotypes of both the homozygote parents, it is called:

- A. Incomplete dominance ✓ **Correct answer**
- B. Epistasis
- C. Pleiotropy
- D. Codominance

A. When the heterozygote's phenotype is intermediate between the two homozygotes, it is incomplete dominance.

B. Epistasis is one gene masking another, not an intermediate phenotype.

C. Pleiotropy is one gene affecting several traits, not an intermediate phenotype.

D. In codominance both parental phenotypes appear fully (not an intermediate).

174 Biology

Which one of correct about 'Rh+' blood?

- A. Will produce anti-Rh antibodies if given Rh+ blood
- B. Cannot produce anti-Rh antibodies in any case
- C. Rh+ antigens are present on RBCs ✓ **Correct answer**
- D. Rh+ antibodies are present in blood

A. An Rh+ person already has the Rh antigen and does not make anti-Rh antibodies; the official key gives A, which is wrong.

B. An Rh− person can produce anti-Rh antibodies after exposure to Rh+ blood, so this is false.

C. Rh+ blood means the Rh (D) antigen is present on the red blood cells.

D. Rh antibodies are not normally present in blood (they form only after sensitisation).

Question 175 Biology

Temperature-insensitive (thermostable) enzyme used in PCR is:

- A. DNA polymerase I
- B. DNA polymerase III
- C. DNA ligase
- D. Taq polymerase ✓ **Correct answer**

A. DNA polymerase I is not thermostable and is denatured by PCR temperatures.

B. DNA polymerase III is not thermostable.

C. DNA ligase is not the thermostable enzyme used in PCR.

D. Taq polymerase (from Thermus aquaticus) withstands the high temperatures of PCR.

176 Biology

Cloning is a form of:

- A. Parthenogenesis
- B. Apomixis
- C. Sexual Reproduction
- D. Asexual Reproduction ✓ **Correct answer**

A. Parthenogenesis is development from an unfertilised egg; cloning is not that.

B. Apomixis is seed formation without fertilisation in plants; cloning is not that.

C. Cloning involves no fusion of gametes.

D. Cloning produces genetically identical copies without gamete fusion: asexual reproduction.

Question 177 Biology

Antigens to treat Non-Hodgkin's lymphoma are produced by:

- A. Wheat Plant
- B. Rice Plant
- C. Tobacco Plant ✓ **Correct answer**
- D. Corn Plant

A. Wheat is not the plant used to produce these antigens.

B. Rice is not the plant used to produce these antigens.

C. Tobacco plants are used as bioreactors to produce the antigens (antibodies) for treating Non-Hodgkin's lymphoma.

D. Corn is not the plant used to produce these antigens.

178 Biology

The survival of an organism during the struggle for existence is not random, but depends on:

- A. Its genetic constitution ✓ **Correct answer**
- B. Its ability to acquire characters
- C. Its ability to over-produce
- D. Its ability to over-eat

A. Survival depends on the organism's heritable (genetic) constitution, which natural selection acts on.

B. Acquired characters are not inherited and do not decide survival.

C. Over-production creates the struggle, it does not decide who survives it.

D. Eating ability does not decide survival.

Question 179 Biology

Evolutionary relationships amongst species are reflected in their:

- A. DNA and proteins ✓ **Correct answer**
- B. RNAs and proteins
- C. DNA and gene
- D. DNA and RNAs

A. Evolutionary relationships are compared through DNA sequences and the proteins they encode.

B. RNA sequences are less used than DNA for this comparison.

C. "DNA and gene" is redundant (genes are DNA).

D. Proteins, not RNAs, are the standard comparison alongside DNA.

180 Biology

If all the members of a population are homozygous for the same allele, that allele is said to be:

- A. Random in population's pool
- B. Fixed in population's pool
- C. Random in a species
- D. Fixed in the gene pool ✓ **Correct answer**

A. An allele present in every member is not random.

B. The textbook term is "fixed in the gene pool".

C. An allele present in every member is not random.

D. When every member is homozygous for the same allele, it is fixed in the gene pool.

Question 181 Biology

Diseases in living organisms which are caused by parasites are called:

- A. Disinfestations
- B. Antisepsis
- C. Infections
- D. Infestations ✓ **Correct answer**

A. Disinfestation is the removal of parasites, not the disease.

B. Antisepsis is the prevention of infection, not the disease.

C. Infections are caused by microorganisms (bacteria, viruses), not parasites.

D. Diseases caused by parasites are called infestations.

182 Biology

The nutrient cycles are also called:

- A. Biogeochemical cycles ✓ **Correct answer**
- B. Biochemical cycles
- C. Bio element cycles
- D. Geochemical cycles

A. Nutrient cycles (carbon, nitrogen, water) are called biogeochemical cycles.

B. "Biochemical cycle" is not the name for nutrient cycles.

C. Not the name for nutrient cycles.

D. Geochemical cycles cover only the earth's chemistry, not the biological part.

Question 183 Biology

The productivity of aquatic ecosystem is determined by:

- A. Water
- B. Light and nutrients ✓ **Correct answer**
- C. Light
- D. Nutrients

A. Water alone does not determine aquatic productivity.

B. Aquatic productivity is limited by both light (for photosynthesis) and nutrients.

C. Light alone is not enough; nutrients also limit productivity.

D. Nutrients alone are not enough; light also limits productivity.

Question 184 Biology

What is the drawback of nuclear energy?

- auses radiation pollution ✓ **Correct answer**
- B. It is not long lasting
- C. It is very expensive
- D. It pollutes the air

A. The main drawback of nuclear energy is radioactive waste and radiation pollution.

B. Nuclear fuel lasts a long time; this is not the drawback.

C. Cost is a disadvantage but not the textbook drawback.

D. Nuclear plants do not pollute the air with smoke.

Question 185 Biology

Arteriosclerosis is:

- A. A metabolic disorder
- B. A degenerative Disorder ✓ **Correct answer**
- C. An infectious disorder
- D. A nutritional deficiency disorder

A. Arteriosclerosis is not a metabolic disorder.

B. Arteriosclerosis (hardening of the arteries) is a degenerative disorder of old age.

C. Arteriosclerosis is not caused by infection.

D. Arteriosclerosis is not caused by nutritional deficiency.

Question 186 Biology

Antibiotics act against:

- A. Bacterial Diseases ✓ **Correct answer**
- B. Allergies
- C. Bacterial and Viral Diseases

A. Antibiotics kill or inhibit bacteria.

B. Antibiotics do not treat allergies.

C. Antibiotics have no effect on viruses.

D. Antibiotics do not act against viruses.

Question 187 Biology

Immediate source of energy for cellular metabolism is:

- A. Lipids
- B. ATP ✓ **Correct answer**
- C. Carbohydrates
- D. Proteins

A. Lipids are a stored energy source, not the immediate one.

B. ATP is the immediate energy currency of the cell.

C. Carbohydrates are oxidised to make ATP; they are not the immediate source.

D. Proteins are not the immediate energy source.

Question 188 Biology

Haemoglobin exhibits:

- A. Secondary Structure
- B. Primary Structure
- C. Quaternary Structure ✓ **Correct answer**
- D. Tertiary Structure

A. Haemoglobin's structure goes beyond the secondary level.

ry structure is only the amino-acid sequence.

C. Haemoglobin has four polypeptide subunits, i.e. quaternary structure.

D. Tertiary structure is the folding of a single chain; haemoglobin has four chains.

Question 189 Biology

Pepsin enzyme is produced in an inactive form and is activated in situation when it is required because:

- A. Not produced in complete form
- B. Quite capable of destroying cells internal structure ✓ **Correct answer**
- C. It does not work efficiently at that time
- D. None of the above

A. Pepsinogen is complete but inactive; the reason is not incompleteness.

B. Pepsin is produced inactive (as pepsinogen) because active pepsin would digest the cells that make it.

C. Efficiency is not the reason for the inactive form.

D. B is the correct reason.

Question 190 Biology

Enzyme after catalysis detaches itself from the product:

- A. Completely
- B. Incompletely
- C. Changed
- D. Unchanged ✓ **Correct answer**

A. "Completely" describes how it detaches, not its state.

B. The enzyme detaches completely.

e is not changed by catalysis.

D. After catalysis the enzyme detaches itself unchanged, ready to catalyse again.

Question 191 Biology

A group of ribosomes attached to messenger RNA is known as:

- A. Ribosome
- B. Lysosome
- C. Nucleosome
- D. Polysome ✓ **Correct answer**

A. A single ribosome is not a group of ribosomes.

B. A lysosome is a digestive organelle, not ribosomes on mRNA.

C. A nucleosome is DNA wrapped around histones, not ribosomes on mRNA.

D. A group of ribosomes attached to one mRNA is a polysome (polyribosome).

Question 192 Biology

Detoxification of harmful drugs within the cell is done by:

- A. Nucleolus
- B. Smooth Surface Endoplasmic Reticulum ✓ **Correct answer**
- C. Ribosomes
- D. Food Vacuoles

A. The nucleolus makes ribosomal RNA; it does not detoxify drugs.

B. The smooth ER detoxifies drugs and poisons in the cell.

C. Ribosomes synthesise proteins; they do not detoxify drugs.

D. Food vacuoles digest food; they do not detoxify drugs.

193 Biology

Tay-Sach's disease is due to the presence of an enzyme that is inverted in the catabolism of:

- A. Proteins
- B. Carbohydrates
- C. Ascorbic Acid
- D. Lipids ✓ **Correct answer**

A. Tay-Sachs is not a defect in protein catabolism.

B. Tay-Sachs is not a defect in carbohydrate catabolism.

C. Tay-Sachs has nothing to do with ascorbic acid.

D. Tay-Sachs is due to the absence of hexosaminidase A, an enzyme of lipid (ganglioside) catabolism; the paper's "inverted" is its wording for the missing enzyme.

Question 194 Biology

What is true about pattern baldness?

- A. It is autosomal recessive disease in males
- B. It is autosomal dominant disease in males ✓ **Correct answer**
- C. It is X-linked disease
- D. It is Y-linked disease

A. Pattern baldness is dominant, not recessive.

B. Pattern baldness is an autosomal dominant trait (expressed mainly in males under testosterone).

C. Pattern baldness is autosomal, not X-linked.

D. Pattern baldness is autosomal, not Y-linked.

195 Biology

Symptoms of Herpes Simplex is:

- A. Abdominal Pain
- B. Fever
- C. Vesicular lesions in the epithelial layer ✓ **Correct answer**
- D. Failure of immune system

A. Herpes simplex does not present with abdominal pain.

B. Fever is a general symptom, not the characteristic symptom of herpes simplex.

C. Herpes simplex produces vesicular (blister) lesions in the epithelial layer.

D. Herpes simplex does not cause failure of the immune system.

Question 196 Biology

The major cell infected by the HIV is:

- A. Leucocyte
- B. Monocyte
- C. Helper T-lymphocyte ✓ **Correct answer**
- D. B-lymphocyte

A. Too general; HIV specifically targets helper T-lymphocytes.

B. Monocytes/macrophages can be infected, but the major target is the helper T-lymphocyte.

C. HIV chiefly infects CD4 helper T-lymphocytes.

D. B-lymphocytes are not the major cell infected by HIV.

197 Biology

_____ are used as important vectors in genetic engineering.

- A. Ribosomes
- B. Plasmids ✓ **Correct answer**
- C. Nucleoids
- D. Mesosomes

A. Ribosomes synthesise proteins; they are not vectors.

B. Plasmids are the classic vectors used in genetic engineering.

C. The nucleoid is the bacterial chromosome region, not a vector.

D. Mesosomes are membrane folds in bacteria, not vectors.

Question 198 Biology

Which of the following is aerobic bacterium?

- A. Spirochete
- B. Cyanobacteria
- C. E. coli
- D. Pseudomonas ✓ **Correct answer**

A. Spirochetes are mostly anaerobic or microaerophilic.

B. Cyanobacteria are photosynthetic, not classified as aerobic bacteria here.

C. E. coli is a facultative anaerobe, not an obligate aerobe.

D. Pseudomonas is an aerobic (obligate aerobe) bacterium.

Question 199 Biology

The giant amoebas inhabit mud at the bottom of fresh water ponds and obtain energy

- A. Microscopic bacteria
- B. Aerobic bacteria
- C. Anaerobic bacteria
- D. Methanogenic bacteria ✓ **Correct answer**

A. Too general; the giant amoeba (Pelomyxa) specifically harbours methanogenic bacteria.

B. The mud habitat is anaerobic, not aerobic.

C. Too general; the specific association is with methanogenic bacteria.

D. Giant amoebas (Pelomyxa) in pond mud obtain energy through their symbiotic methanogenic bacteria.

Question 200 Biology

A large group of parasitic protozoa, some of which causes various diseases such as malaria to humans, are:

- A. Aschelminthes
- B. Platyhelminthes
- C. Annelida
- D. Arthropods

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). No option names a protozoan group: Aschelminthes are roundworms, Platyhelminthes are flatworms, Annelida are segmented worms and Arthropods are jointed-legged animals — none is a protozoan group (malaria is caused by Plasmodium, a sporozoan). The official key gives A, which is wrong — Aschelminthes are not protozoa. This question must never be taught as having an answer.

201 Biology

Penicillin is obtained from:

- A. Penicillium notatum ✓ **Correct answer**
- B. Aspergillus flavus
- C. Aspergillus fumigatus
- D. Penicillium chrysogenum

A. Penicillin was first obtained from Penicillium notatum (the textbook answer).

B. Aspergillus flavus does not produce penicillin.

C. Aspergillus fumigatus does not produce penicillin.

D. Penicillium chrysogenum is used industrially today, but the textbook answer is P. notatum.

Question 202 Biology

Which of the following components is less resistant to decay?

- A. Lignin
- B. Starch ✓ **Correct answer**
- C. Chitin
- D. Cellulose

A. Lignin is the most resistant of the four to decay.

B. Starch is readily hydrolysed by amylases and decomposes fastest of the four; it is the least resistant to decay. The official key gives C, which is wrong.

C. Chitin is a decay-resistant structural polysaccharide (fungal walls, insect exoskeletons persist); the key's answer is wrong.

D. Cellulose is fairly resistant to decay, though less so than lignin.

203 Biology

_____ are bioindicators of air pollution.

- A. Cyanobacteria
- B. Fungi
- C. Mycorrhiza
- D. Lichens ✓ **Correct answer**

A. Cyanobacteria are not the standard bioindicators of air pollution.

B. Fungi in general are not the bioindicators of air pollution.

C. Mycorrhiza is a root-fungus association, not an air-pollution bioindicator.

D. Lichens are sensitive to air pollution (especially SO_2) and are used as bioindicators.

Question 204 Biology

The gymnosperms are called 'Naked Seeded' plants because they bear naked:

- A. Antheridia
- B. Ovules ✓ **Correct answer**
- C. Fruits
- D. Archegonia

A. Antheridia are male gametangia, not what makes the seed naked.

B. Gymnosperms bear their ovules (seeds) naked, unenclosed in an ovary.

C. Gymnosperms do not form fruits.

D. Archegonia are female gametangia, not what makes the seed naked.

Question 205 Biology

The integumented indehiscent mega sporangium is called:

- B. Megagametophyte
- C. Archegonium
- D. Ovule ✓ **Correct answer**

A. A seed is the fertilised, mature ovule, not the megasporangium itself.

B. The megagametophyte is the female gametophyte inside the ovule.

C. The archegonium is the female gametangium, not the megasporangium.

D. An ovule is an integumented, indehiscent megasporangium.

Question 206 Biology

Pulses are present in the family:

- A. Caesalpiniaceae
- B. Fabaceae ✓ **Correct answer**
- C. Gramineae
- D. Mimosaceae

A. Caesalpiniaceae is a related legume family, not the pulse family.

B. Pulses (gram, pea, lentil) belong to the family Fabaceae (Leguminosae).

C. Gramineae is the grass family (cereals), not pulses.

D. Mimosaceae is a related legume family, not the pulse family.

Question 207 Biology

It is an endoparasite of humans, cattle and pig that completes its life cycle in two hosts:

- A. Tapeworm ✓ **Correct answer**
- B. Aurelia
- C. Liver fluke

A. The tapeworm is an endoparasite of humans, cattle and pig, completing its life cycle in two hosts.

B. Aurelia is a free-living jellyfish, not an endoparasite.

C. The liver fluke uses a snail and a vertebrate host, but the textbook answer for this description is the tapeworm.

D. Planaria is a free-living flatworm, not an endoparasite.

Question 208 Biology

Tse-tse fly causes the sleeping sickness and skin diseases by transmitting:

- A. Plasmodium
- B. Trypanosoma ✓ **Correct answer**
- C. Anopheles
- D. Insects

A. Plasmodium (malaria) is transmitted by Anopheles mosquitoes, not tsetse flies.

B. The tsetse fly transmits Trypanosoma, which causes sleeping sickness.

C. Anopheles is a mosquito, not what the tsetse fly transmits.

D. "Insects" is not the transmitted organism.

Question 209 Biology

Coelem is a cavity lined by:

- A. Mesoderm ✓ **Correct answer**
- B. Endoderm
- C. Epiderm
- D. Ectoderm

m is a body cavity lined by mesoderm.

B. Endoderm lines the gut, not the coelom.

C. The epidermis is the outer skin, not the coelom lining.

D. Ectoderm forms the outer layer, not the coelom lining.

Question 210 Biology

Which of the following molecules is reduced by accepting hydrogen in Calvin Cycle?

- A. Glyceraldehyde-3-phosphate
- B. Ribulose bisphosphate
- C. 3-Phosphoglycerate
- D. 1,3-Bisphosphoglycerate ✓ **Correct answer**

A. Glyceraldehyde-3-phosphate is the product of the reduction, not the molecule reduced.

B. Ribulose bisphosphate is the CO_2 acceptor; it is not reduced here.

C. 3-Phosphoglycerate is first phosphorylated to 1,3-bisphosphoglycerate, not reduced directly.

D. 1,3-Bisphosphoglycerate is reduced by NADPH (accepting hydrogen) to glyceraldehyde-3-phosphate in the Calvin cycle.

Question 211 Biology

The molecule formed after first phosphorylation during glycolysis is:

- A. Fructose-6-phosphate
- B. Fructose-1, 6-bisphosphate
- C. Glucose-1-phosphate
- D. Glucose-6-phosphate ✓ **Correct answer**

A. Fructose-6-phosphate is formed after isomerisation of glucose-6-phosphate, not by the

orylation.

B. Fructose-1,6-bisphosphate is formed by the second phosphorylation.

C. Glucose-1-phosphate is not formed in glycolysis.

D. The first phosphorylation of glycolysis converts glucose to glucose-6-phosphate.

Question 212 Biology

Krebs Cycle in mitochondria takes place in:

- A. Cytosol
- B. Matrix ✓ **Correct answer**
- C. Outer Membrane
- D. Inner Membrane

A. Glycolysis takes place in the cytosol, not the Krebs cycle.

B. The Krebs cycle takes place in the mitochondrial matrix.

C. The Krebs cycle does not take place in the outer membrane.

D. The electron transport chain is on the inner membrane, not the Krebs cycle.

Question 213 Biology

At the junction between esophagus and the stomach there is a special ring of muscles called:

- A. Cardiac Sphincter ✓ **Correct answer**
- B. Ileocolic Sphincter
- C. Esophageal Sphincter
- D. Pyloric Sphincter

A. The ring of muscle at the oesophagus–stomach junction is the cardiac sphincter.

lic sphincter is at the ileum–colon junction.

C. Not the textbook name for this ring (the cardiac sphincter is the lower oesophageal sphincter).

D. The pyloric sphincter is at the stomach–duodenum junction.

Question 214 Biology

Hepatic and pancreatic secretions are also stimulated by a hormone called:

- A. Gastrin
- B. Secretin ✓ **Correct answer**
- C. Insulin
- D. Glucagon

A. Gastrin stimulates gastric juice, not hepatic and pancreatic secretions.

B. Secretin stimulates the liver and pancreas to release their secretions.

C. Insulin regulates blood glucose; it does not stimulate these secretions.

D. Glucagon raises blood glucose; it does not stimulate these secretions.

Question 215 Biology

Like pepsin, trypsin is also secreted as inactive trypsinogen, which is activated by:

- A. Enterokinase ✓ **Correct answer**
- B. Lipase
- C. Chyme
- D. Erypsin

A. Enterokinase (enteropeptidase) activates trypsinogen to trypsin.

B. Lipase digests fats; it does not activate trypsinogen.

the food mixture in the gut, not an activator.

D. Erepsin is a mixture of peptidases, not the activator of trypsinogen.

Question 216 Biology

During photorespiration, the glycolate is converted into glycine in a structure of cell called:

- A. Golgi Bodies
- B. Glyoxisome
- C. Mitochondria
- D. Peroxisome ✓ **Correct answer**

A. Glycolate is not converted to glycine in the Golgi bodies.

B. Glyoxysomes handle the glyoxylate cycle in seeds, not photorespiration.

C. In photorespiration, glycine is converted to serine in the mitochondria, but glycolate is converted to glycine in the peroxisome.

D. During photorespiration, glycolate is converted into glycine in the peroxisome.

Question 217 Biology

The respiratory pigment, which has much higher affinity to combine with oxygen, is:

- A. Myoglobin ✓ **Correct answer**
- B. Globin
- C. Haemoglobin
- D. Hemocyanin

A. Myoglobin has a much higher affinity for oxygen than haemoglobin (it stores oxygen in muscle).

B. Globin alone is not the respiratory pigment.

…bin carries oxygen in blood but has a lower affinity than myoglobin.

D. Hemocyanin is the copper-based pigment of some invertebrates, not the higher-affinity one here.

Question 218 Biology

Most of the carbon dioxide is carried in the blood in the form of:

- A. Bicarbonate ✓ **Correct answer**
- B. Carboxyhemoglobin
- C. CO_2
- D. Blood plasma protein

A. Most CO_2 is carried in the blood as bicarbonate ions (HCO_3^-) in the plasma.

B. Only a small fraction of CO_2 is carried as carbamino/carboxyhaemoglobin.

C. Only a small fraction is carried as dissolved CO_2.

D. CO_2 is not mainly carried bound to plasma protein.

Question 219 Biology

Antibiotics are actually:

- A. Globular proteins ✓ **Correct answer**
- B. Glycoproteins
- C. Fibrous proteins
- D. Glycolipids

A. The textbook item is that antibodies are globular proteins (the paper prints "Antibiotics", evidently for "Antibodies"); globular proteins is the intended answer.

B. Antibodies are not classified as glycoproteins here.

C. Antibodies are globular, not fibrous, proteins.

s are proteins, not glycolipids.

Question 220 Biology

Heparin prevents blood clots and is released by:

- A. Eosinophils
- B. Monocytes
- C. Neutrophils
- D. Basophils ✓ **Correct answer**

A. Eosinophils fight parasites and allergies; they do not release heparin.

B. Monocytes are phagocytes; they do not release heparin.

C. Neutrophils are phagocytes; they do not release heparin.

D. Basophils (like mast cells) release heparin, which prevents blood clotting.

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