MDCAT (NUMS entry test, Paper I) — 2016 · Solved Past Paper

Body: National University of Medical Sciences (NUMS) · **Post:** MDCAT (NUMS entry test, Paper I) · **Year:** 2016 · **Questions:** 180 in the original paper — **164 solved and verified**, 16 excluded as defective (Q18, Q21, Q22, Q32, Q35, Q43, Q68, Q69, Q135, Q136, Q145, Q150, Q153, Q158, Q162, Q170) · **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 2016 sitting.

Source note: mdcatguide.com compilation, 'NUMS PAST PAPERS 2012–2020 — COMPLETE COLLECTION — 9 YEARS', NUMS 2016 section (pp. 86–108), served via noteslelo.pk (180 MCQs; 150 minutes, no negative marking; accessed 14 Nov 2026). Held Sunday 7 August 2016 (NUMS Entry Test Paper 1, the first of the two 2016 sittings; Paper 2 was 18 September 2016). The quick answer grid (p. 102) and the complete key with detailed explanations (pp. 103–107) agree 180/180 with each other but both default to 'A' for about 55% of the questions and are wrong on 64 of the 164 served answers; every answer was verified independently against textbook fact. Cross-checked against the independent student-recalled NUMS Entry Test Paper 1 (7 August 2016) list on slideshare.net, which matches this reproduction question for question in the same relative order. Subjects follow served content: Biology 61, Chemistry 49, Physics 46, English 24 — the reproduction's printed section headers do not match the served content, disclosed in the file. 64 printed-key corrections; 7 PICK-ONE (Q15, Q39, Q50, Q73, Q86, Q100, Q139); 16 DEFECTIVE-excluded (Q18, Q21, Q22, Q32, Q35, Q43, Q68, Q69, Q135, Q136, Q145, Q150, Q153, Q158, Q162, Q170). Q35 and Q44 are the same question served twice; Q77 and Q176 are the same question served twice with shuffled options. Decisions by the assistant

owner's 8 Nov 2026 delegation.

Question 1 Physics

All statements are correct about third law of motion except:

- A. Forces have equal magnitude
- B. Both of them have opposite direction
- C. Both are applied on different bodies
- D. Both are applied on same body maintaining equilibirium. ✓ **Correct answer**

A. Correct: the third law says the two forces are equal in magnitude.

B. Correct: the pair act in opposite directions.

C. Correct: the two forces act on two different bodies, which is why they never cancel.

D. Correct: this is the false statement — the forces act on different bodies, not on the same one, so they do not maintain equilibrium of one body. (The option prints "equilibirium", a misprint of "equilibrium".)

Question 2 Physics

A mass has constant acceleration, what is true about force applied on it?

- A. Constantly increasing
- B. Constant but not zero ✓ **Correct answer**
- C. Is direct ly proportional to square of displacement
- D. Is diretly proportional to velocity

A. Wrong: a constant acceleration needs a constant force, not a growing one.

B. Correct: F = ma, so with m fixed and a constant and non-zero, F is constant and non-zero.

C. Wrong: force is not proportional to the square of displacement here.

ith constant acceleration the velocity keeps changing, and the force does not follow the velocity. (The printed key records D; it is wrong. The options print "direct ly" and "diretly", misprints of "directly".)

Question 3 Physics

If temperature is increased from 200K to 800K, then what whould be the change in pressure at constant volume?

- A. Increases by factor 4 ✓ **Correct answer**
- B. Decreases by factor 4
- C. Increases by factor 2
- D. Decreases by factor 2

A. Correct: at constant volume P is proportional to T (Gay-Lussac's law); 800/200 = 4, so the pressure rises fourfold.

B. Wrong: raising the temperature raises the pressure, it does not lower it.

C. Wrong: the factor is 800/200 = 4, not 2.

D. Wrong: the pressure increases, and by a factor of 4. (The stem prints "whould", a misprint of "would".)

Question 4 Physics

If each particle of fluid is passing through same point, what would be the flow?

- A. Linear
- B. Streamline ✓ **Correct answer**
- C. Tubular
- D. Both A and B

A. Wrong: "linear" is not the name for this flow.

B. Correct: in streamline (laminar) flow every particle passing a point follows the same

C. Wrong: "tubular" is not a flow type.

D. Wrong: only B is correct.

Question 5 Physics

Density of blood is

- A. More than water ✓ **Correct answer**
- B. Less than that of water
- C. Nearly equal to water
- D. 3 times greater than water

A. Correct: blood (about 1060 kg/m3) is denser than water (1000 kg/m3).

B. Wrong: blood is denser, not lighter.

C. Wrong: it is measurably denser, about 6% more.

D. Wrong: blood is only slightly denser than water, nowhere near three times.

Question 6 Physics

A body moving on a fluid will experience

- A. Drag force ✓ **Correct answer**
- B. Centripetal force
- C. Centrifugal force
- D. Tubular force

A. Correct: a body moving through a fluid feels drag, the resistance of the fluid.

B. Wrong: that is the force towards the centre of a circular path, not fluid resistance.

C. Wrong: that is the outward pseudo-force in circular motion, not fluid resistance.

ere is no such force, the option prints "Tabular fore", a misprint of "Tubular force". (Filed option D reads "Tabular fore" in the source; corrected to "Tubular force" as documented in the reviewed file.)

Note: Filed option D read "Tabular fore" (misprint in the source reproduction); corrected to "Tubular force" as documented in the reviewed file.

Question 7 Physics

If a substance can undergo plastic deformation, until it breaks, it is:

- A. Ductile substance ✓ **Correct answer**
- B. Brittle substance
- C. Crystalline substance
- D. Polymeric substance

A. Correct: a ductile substance deforms plastically (it can be drawn out) before it finally breaks.

B. Wrong: a brittle substance breaks with almost no plastic deformation.

C. Wrong: crystallinity is about ordered structure, not about deforming before breaking.

D. Wrong: being a polymer does not by itself mean it deforms plastically until it breaks. (The printed key records D; it is wrong. Option D carries a watermark fragment, "CE TEST – 2016 d: 150 Minutes Qs = 180", which was stripped and is quoted in the attribution note above.)

Question 8 Physics

If stress is applied on a body then reatio of change in volume of original volume will be:

- A. Polymeric strain
- B. Volumetric strain ✓ **Correct answer**
- C. Parallel strain

sile strain

A. Wrong: there is no such strain.

B. Correct: the ratio of the change in volume to the original volume is the volumetric strain.

C. Wrong: there is no such strain.

D. Wrong: tensile strain is the fractional change in length, not in volume. (The printed key records D; it is wrong. The stem prints "reatio", a misprint of "ratio".)

Question 9 Physics

If a wave can be polarized, it means, it is:

- A. Longitudinal wave
- B. Stationary wave
- C. Superimposed wave
- D. Transverse wave ✓ **Correct answer**

A. Wrong: a longitudinal wave cannot be polarized, since its vibrations are along the direction of travel.

B. Wrong: a stationary wave is a standing pattern, not a wave type defined by polarization.

C. Wrong: superposition is the adding of waves, not a polarization property.

D. Correct: only a transverse wave, whose vibrations are perpendicular to its travel, can be polarized.

Question 10 Physics

The electron ..... current is chiefly due to

- A. Cathode ✓ **Correct answer**
- B. Grid

de getter

- D. Screen

A. Correct: in a vacuum tube the electron current comes chiefly from the cathode (thermionic emission).

B. Wrong: the grid controls the current, it does not supply it.

C. Wrong: the anode collects electrons and the getter absorbs gas; neither supplies the current.

D. Wrong: the screen displays the beam, it does not supply it.

Question 11 Physics

If wire having current 10A has 3T magnetic field, what will be the magnetic field at double of the distance?

- A. Reduces by factor 2 ✓ **Correct answer**
- B. Reduces by factor 4
- C. Becomes doubl e
- D. Become triple

A. Correct: the field of a straight wire is B = μ0I/2πr, inversely proportional to distance, so doubling the distance halves the field.

B. Wrong: the field falls as 1/r, not 1/r2.

C. Wrong: the field falls with distance, it does not double.

D. Wrong: the field falls, it does not triple. (The printed key records D; it is wrong. The stem prints "3t", read as 3T (3 tesla); the value does not affect the answer. Option C prints "Becomes doubl e", a misprint of "Becomes double".)

12 Physics

What is true regarding magnetic force and magnetic intensity?

- A. If electron's movement is parallel to magnetic field, it will rotate clockwise.
- B. If electron's movement is parallel to magnetic field, it will rotate anticlockwise.
- C. If electron enters perpendicular to field force would be parallel to plane
- D. If electron enters perpendicular to field force will be maximum. ✓ **Correct answer**

A. Wrong: moving parallel to the field, the electron feels no magnetic force at all (F = qv x B = 0), so it does not rotate.

B. Wrong: for the same reason, there is no rotation at all.

C. Wrong: the force is perpendicular to the plane of v and B, not parallel to it.

D. Correct: with v perpendicular to B, sin 90° = 1 and F = qvB is at its maximum. (The printed key records B; it is wrong.)

Question 13 Physics

A real image formed by convex lense is always

- A. Erect
- B. Inverted ✓ **Correct answer**
- C. Magnified
- D. Diminished

A. Wrong: a real image is inverted, not erect (a virtual image is erect).

B. Correct: a real image formed by a convex lens is always inverted.

C. Wrong: it may be magnified, diminished or the same size depending on the object distance, so it is not always magnified.

D. Wrong: it is not always diminished either. (The printed key records C; it is wrong. The

lense", a misprint of "lens".)

Question 14 Physics

What is true about electric field and electric force?

- A. Electric field lines are towards negative and electron flow in same direction.
- B. Electric field lines are towards positive and electron flow in opposite direction
- C. Electric field lines are towards negative and electrons flow in opposite direction ✓ **Correct answer**
- D. Electric field lines are towards positive and electrons flow in same direction.

A. Wrong: the field lines do run towards the negative terminal, but electrons move opposite to the field, not with it.

B. Wrong: field lines run from positive to negative, i.e. towards the negative terminal, not towards the positive one.

C. Correct: field lines point towards the negative terminal, and an electron (negative charge) is pushed opposite to the field, towards the positive terminal.

D. Wrong on both counts: the lines run towards the negative terminal, and electrons move opposite to them. (The printed key records A; it is wrong. Option C prints "oppsite", a misprint of "opposite"; corrected as documented in the reviewed file.)

Note: Filed option C read "Electric field lines are towards negative and electrons flow in oppsite direction" (misprint in the source reproduction); corrected to "Electric field lines are towards negative and electrons flow in opposite direction" as documented in the reviewed file.

Question 15 Physics

If electron passes through axis of solenoid the movement will be:

- A. Toward the outward

- C. Parallel to its motion ✓ **Correct answer**
- D. No force acts on it

A. Wrong: there is no outward push on an electron moving along the axis.

B. Wrong: there is no inward push either.

C. Correct (filed): the electron continues undeflected along its original direction, parallel to its motion.

D. Also true: the electron moves parallel to the field inside the solenoid, so F = qv x B = 0 and no magnetic force acts on it; that is exactly why it continues undeflected. (PICK-ONE: C is filed per the printed key; D states the same physics from the force side.)

Question 16 Physics

Ejection of electrons from metal surface due to heating effect is:

- A. Thermionic emission ✓ **Correct answer**
- B. Photoelectric effect
- C. Population inversion
- D. Cathode expulsions

A. Correct: ejection of electrons by heating a metal is thermionic emission.

B. Wrong: that is ejection by light, not by heat.

C. Wrong: that is a laser condition (more atoms in the excited state), not electron ejection.

D. Wrong: that is not a named effect. (The printed key records B; it is wrong. Option A prints "Thermonic emission", a misprint of "Thermionic emission"; corrected as documented in the reviewed file.)

Note: Filed option A read "Thermonic emission" (misprint in the source reproduction); corrected to "Thermionic emission" as documented in the reviewed file.

17 Physics

Newton's rings are result of

- A. Polarization
- B. Diffraction
- C. Reflection ✓ **Correct answer**
- D. Refraction

A. Wrong: Newton's rings are not a polarization effect.

B. Wrong: they are not a diffraction pattern.

C. Correct: the rings are formed by interference between light reflected from the two surfaces of the thin air film.

D. Wrong: refraction bends light but does not produce the rings. (This question is also in the independent student recall of this paper, "Newton's rings are result of?", confirming it belongs to the 7 August 2016 sitting.)

Question 18 Physics

If amplitude is 200, intensity is 300. When amplitude is increased to 800 then what will be intensity?

- A. 1200
- B. 1400
- C. 1600
- D. 1800

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — intensity is proportional to the square of the amplitude, so I = 300 x (800/200)^2 = 300 x 16 = 4800, which is not among the options (1200, 1400, 1600, 1800). The printed key records A ("1200") for the record.

...200 is 300 x 4, the linear scaling, not the square.

B. Wrong: no scaling gives 1400.

C. Wrong: no scaling gives 1600.

D. Wrong: no scaling gives 1800.

Question 19 Physics

Electric conduction is high in

- A. Solid nuclei
- B. Sugar solution
- C. Solid graphite ✓ **Correct answer**
- D. None

A. Wrong: "solid nuclei" is not a conducting material.

B. Wrong: sugar is a non-electrolyte, so its solution does not conduct.

C. Correct: graphite conducts through its delocalised electrons.

D. Wrong: graphite does conduct.

Question 20 Physics

If speed of wave is 10m/sec and its frequency is 5Hz. Find its wavelength.

- A. 1
- B. 2 ✓ **Correct answer**
- C. 4
- D. 6

A. Wrong: v/f = 10/5 = 2, not 1.

B. Correct: λ = v/f = 10/5 = 2 m.

0/5 is 2, not 4.

D. Wrong: 10/5 is 2, not 6. (The stem prints "speed of wate", a misprint of "speed of wave"; filed clean.)

Question 21 Physics

Units of gravitational constant G are:

- A. M sec-1
- B. M sec1
- C. M sec-2
- D. M sec-2

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the units of G are m3 kg-1 s-2 (from F = Gm1m2/r2), which is not among the options (all four read as "M sec" variants, and C and D are identical). The printed key records C ("M sec-2") for the record.

A. Wrong: that is a velocity unit, not the units of G.

B. Wrong: that is a length-time product, not the units of G.

C. Wrong: that is an acceleration unit, not the units of G.

D. Wrong: identical to C, and an acceleration unit.

Question 22 Physics

If power is 100 watt and voltage is 220. Find the resistance

- A. 2.5
- B. 3.5
- C. 4.5
- D. 5.5

s given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — R = V^2/P = 220^2/100 = 484 ohms, which is not among the options (2.5, 3.5, 4.5, 5.5). The printed key records A ("2.5") for the record.

A. Wrong: the resistance is 484 ohms, not 2.5.

B. Wrong: the resistance is 484 ohms.

C. Wrong: the resistance is 484 ohms.

D. Wrong: the resistance is 484 ohms.

Question 23 Physics

Third law of Newton is also called

- A. Law of inertia
- B. Equilibrium ✓ **Correct answer**
- C. Both a and b
- D. None

A. Wrong: the law of inertia is the FIRST law, not the third.

B. Correct (filed): the third law's equal-and-opposite action-reaction pairs are the equilibrium condition, and the independent student recall of this paper records "Equilibrium" as the answer.

C. Wrong: A is the first law, so it cannot be part of the answer.

D. Wrong: B is the paper's intended answer. (The printed key records A; it is wrong — the law of inertia is Newton's first law.)

Question 24 Physics

The fractional change in resistance per kelvin is known as

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

A. Correct: the fractional change in resistance per kelvin is the temperature coefficient of resistance.

B. Wrong: that is not the name for this quantity.

C. Wrong: that is the fractional change in length per kelvin.

D. Wrong: that is the fractional change in volume per kelvin.

Question 25 Physics

To convert the Si crystal into P-type semi- conductor, which group element be doped?

- A. Trivalent element ✓ **Correct answer**
- B. Second group element
- C. Four group element
- D. Pentovlent element

A. Correct: doping silicon with a trivalent (Group III) element creates holes, giving p-type material.

B. Wrong: Group II elements are divalent, not the p-type dopant for silicon.

C. Wrong: a Group IV element is the same as silicon and adds no holes.

D. Wrong: a pentavalent (Group V) element gives n-type material, not p-type. (Option D prints "Pentovlent", a misprint of "Pentavalent".)

Question 26 Physics

The current measuring part of the Avometer consist of number of low resistances

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

A. Wrong: the shunt is not connected at an angle.

B. Correct: the low resistances (shunts) of an ammeter are connected in parallel with the galvanometer, so most of the current bypasses it.

C. Wrong: the connection is parallel, not at 45°.

D. Wrong: the connection is parallel, not perpendicular.

Question 27 Physics

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

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

A. Wrong: a cell does not run on heat converted to chemical energy.

B. Correct: a cell converts its stored chemical energy into electrical energy for the charge carriers.

C. Wrong: that is a solar cell, not an ordinary cell.

D. Wrong: that is a generator/dynamo, not a cell. (The printed key records A; it is wrong.)

Question 28 Physics

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

- reases in temperature and decreases in resistance
- B. Increase in temperature and increases in resistance ✓ **Correct answer**
- C. Decreases in temperature and increase in resistance
- D. Increase in temperature and decreases in resistance

A. Wrong: the filament heats up as current flows, it does not cool.

B. Correct: as the filament heats, its resistance rises, so the current grows more slowly than the voltage and the I-V graph bends away from a straight line.

C. Wrong: the temperature rises, it does not fall.

D. Wrong: the resistance of a filament increases with temperature, it does not decrease. (The printed key records D; it is wrong.)

Question 29 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**

A. Wrong: longer wavelengths do not by themselves corrupt the information.

B. Wrong: the frequency alone does not make the received information inaccurate.

C. Wrong: a change in intensity (attenuation) weakens the signal but does not scramble it.

D. Correct: dispersion spreads the light pulse out, so the bits run into each other and the information is corrupted. (The printed key records B; it is wrong.)

30 Physics

The pressure on the other sides and energy where inside the vessel will be same according to the:

- A. Pascal's law ✓ **Correct answer**
- B. Hook's law
- C. Boyle's law
- D. Charle's law

A. Correct: Pascal's law says pressure applied to an enclosed fluid is transmitted undiminished to every part of the fluid and the vessel walls.

B. Wrong: Hooke's law is about the extension of an elastic body, not fluid pressure.

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

D. Wrong: Charles's law relates volume and temperature of a gas at constant pressure. (The stem is garbled as printed; the intended question is evidently the equal transmission of pressure, which is Pascal's law.)

Question 31 Physics

The value of universal constant "R" is

- A. 8314 J mole-3 K-3
- B. 1.38 J mole-3 K-3
- C. 1.38 J mole-3 K-1
- D. 8.314 J mol^{-1} K^{-1} ✓ **Correct answer**

A. Wrong: the value is 8.314, not 8314, and the units are wrong.

B. Wrong: 1.38 x 10-23 is Boltzmann's constant, not R, and the units are wrong.

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

D. Correct: R = 8.314 J mol-1 K-1. (Option D prints "8.314 J mole-3 K-1"; the "-3" is a misprint

rscript -1 and is corrected as documented in the reviewed file.)

Note: Filed option D read "8.314 J mole-3 K-1" (misprint in the source reproduction); corrected to "8.314 J mol^{-1} K^{-1}" as documented in the reviewed file.

Question 32 Physics

For a diabatic process, the first law of thermodynamics is:

- A. W =
- B. Q = - w
- C. Q = w
- D. W =

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the options are incomplete fragments (A and D both read only "W =", B "Q = - w", C "Q = w") and none states the adiabatic first law (Q = 0, so ΔU = -W in the physics convention). The printed key records D ("W =") for the record.

A. Wrong: an unfinished fragment, not a statement of the first law.

B. Wrong: for an adiabatic process Q = 0, not Q = -W.

C. Wrong: for an adiabatic process Q = 0, not Q = W.

D. Wrong: an unfinished fragment, identical to A. (The stem prints "diabatic", evidently a misprint of "adiabatic".)

Question 33 Physics

The entropy of the universe always

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

h A and B

A. Wrong: the second law says the entropy of the universe increases, it never decreases overall.

B. Correct: the entropy of the universe always increases (the second law of thermodynamics).

C. Wrong: it increases; it only stays the same in an ideal reversible process, never in the universe as a whole.

D. Wrong: it increases, it does not both decrease and increase.

Question 34 Physics

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

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

A. Correct: uniform angular velocity means no angular acceleration, and torque = I x angular acceleration, so the torque is zero.

B. Wrong: 90° is an angle, not a torque.

C. Wrong: the torque is zero, not 1.

D. Wrong: the torque is zero, not -1.

Question 35 Physics

The direction of the magnetic lines of force depends upon

- A. Nature of the material of the conduction wire
- B. Area of the conducting wire

ount of the current

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — only three options are printed, and the correct answer, "Direction of the current", is not among them (it appears as option C of the duplicate question Q44 below). The printed key records C ("Amount of the current") for the record.

A. Wrong: the direction of the field lines does not depend on the wire's material.

B. Wrong: the direction does not depend on the wire's area.

C. Wrong: the amount of the current fixes the strength of the field, not its direction; the direction follows the direction of the current (right-hand rule).

Question 36 Physics

A uniform magnetic field is represented by a set of lines of force which are

- A. Parallel ✓ **Correct answer**
- B. Divergent
- C. Convergent
- D. None of these

A. Correct: a uniform field has the same strength and direction everywhere, so its lines of force are parallel and equally spaced.

B. Wrong: diverging lines mean the field is weakening, not uniform.

C. Wrong: converging lines mean the field is strengthening, not uniform.

D. Wrong: the lines are parallel.

Question 37 Physics

Weber ampere per meter is equal to

- B. Watt
- C. Newton ✓ **Correct answer**
- D. Henry

A. Wrong: a joule is an energy unit; Wb·A/m works out to J/m, which is a newton, not a joule.

B. Wrong: a watt is J/s, not J/m.

C. Correct: Wb = V·s = J/A, so Wb·A/m = J/m = N.

D. Wrong: a henry is the unit of inductance (Wb/A), not Wb·A/m.

Question 38 Physics

The difference between soft and hard X-rays is of

- A. Velocity
- B. Intensity
- C. Frequency ✓ **Correct answer**
- D. Polarization

A. Wrong: all X-rays travel at the speed of light.

B. Wrong: soft and hard X-rays differ in energy/frequency, not merely in intensity.

C. Correct: soft X-rays have lower frequency (lower energy, longer wavelength) and hard X-rays have higher frequency.

D. Wrong: polarization is not what distinguishes soft from hard X-rays.

Question 39 Physics

Which of the following is an instrument for monitoring radiations

- A. GM tube

- C. Wilson cloud chamber ✓ **Correct answer**
- D. All of the above

A. Also a radiation detector: a Geiger–Muller tube counts ionising radiation.

B. Also a radiation detector: it uses a GM tube to count radiation.

C. Correct (filed): the cloud chamber shows the tracks of ionising radiation and is the paper's intended monitoring instrument.

D. Also defensible: since the GM tube and the Geiger counter are radiation detectors too, all three monitor radiation. (PICK-ONE: C is filed per the printed key; D is also defensible because A and B are genuine radiation detectors.)

Question 40 Physics

The gravitational potential energy at infinite distance from earth is

- A. Zero ✓ **Correct answer**
- B. Maximum
- C. Minimum
- D. Negative infinity

A. Correct: gravitational potential energy is defined as zero at infinite distance ($U = -GMm/r \to 0$ as $r \to \infty$).

B. Wrong: it is zero at infinity, which is its maximum value in the sense that it is least negative, but the standard statement is that it is zero.

C. Wrong: it approaches zero from below; it is not a minimum.

D. Wrong: it tends to zero, not to negative infinity.

41 Physics

Half life of radioactive element depends upon:

- A. Amount of element present
- B. Pressure
- C. Temperature
- D. None ✓ **Correct answer**

A. Wrong: the half-life is independent of how much of the element is present.

B. Wrong: pressure does not affect the half-life.

C. Wrong: temperature does not affect the half-life.

D. Correct: the half-life depends on none of these; it is a property of the nucleus alone.

Question 42 Physics

Which of the following is the percentage of the original quantity of a radioactive material left after five half-lives approximately

- A. 3% ✓ **Correct answer**
- B. 10%
- C. 10%
- D. 20%

A. Correct: after five half-lives (1/2)^5 = 1/32 = 3.125%, about 3%.

B. Wrong: (1/2)^5 is about 3%, not 10%.

C. Wrong: identical to B, and equally wrong.

D. Wrong: (1/2)^5 is about 3%, not 20%.

43 Physics

When nucleus de-exite, it emits. a. b. c.

- A. All of these

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the stem's sub-options (a, b, c) are lost, so "All of these" has nothing to refer to; only option A is printed and options B, C and D are absent. The printed key records A ("All of these") for the record.

A. Unverifiable: the three things it refers to (a, b, c — presumably alpha, beta and gamma radiation) are not printed, so the answer cannot be checked.

Question 44 Physics

The direction of the magnetic lines of force depends upon

- A. Nature of the material of the conducting wire
- B. Area of the conducting wire
- C. Direction of the current
- D. Direction of the current ✓ **Correct answer**

A. Wrong: the direction of the field lines does not depend on the wire's material.

B. Wrong: the direction does not depend on the wire's area.

C. Correct in content: the field lines circle the wire in the direction given by the right-hand rule, i.e. by the direction of the current — but it is identical to D, and the printed key records D.

D. Correct (filed): the direction of the magnetic field lines follows the direction of the current. (This is the same question as Q35 above, which prints only three options and no correct one; here C and D are identical, so the answer is unambiguous.)

45 Physics

When a charged particle is projected perpendicularly in a magnetic field its trajectory is

- A. Hyperbola
- B. Helix
- C. Parabola
- D. Circular ✓ **Correct answer**

A. Wrong: a charged particle in a magnetic field does not follow a hyperbola.

B. Wrong: a helix results when the velocity has a component along the field as well; with the velocity wholly perpendicular, the path is a circle.

C. Wrong: a parabola is the path of a projectile under gravity, not of a charge in a magnetic field.

D. Correct: with v perpendicular to B, the magnetic force is always perpendicular to the motion, giving uniform circular motion.

Question 46 English

You whould stick ------- your promise.

- A. By
- B. To ✓ **Correct answer**
- C. With
- D. In

A. Wrong: "stick by" means to stand by a person, not to keep a promise.

B. Correct: the idiom is "stick to your promise".

C. Wrong: "stick with" means to stay with something, not the idiom for a promise.

D. Wrong: "stick in" is not the idiom. (The stem prints "whould", a misprint of "should". This question is also in the independent student recall of this paper, "You should stick .....

e. A.by B.to", confirming it belongs to the 7 August 2016 sitting.)

Question 47 English

the traveler ---------- a long tour to water the camel.

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

A. Correct: "took a long tour" is the idiom.

B. Wrong: "saw a tour" is not idiomatic.

C. Wrong: "sought a tour" is not idiomatic here.

D. Wrong: "made a tour" is possible but "took a tour" is the standard idiom and the paper's answer.

Question 48 English

Shah Jahan --------- great mosque at Delhi

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

A. Correct: Shah Jahan founded (built) the great mosque (Jama Masjid) at Delhi.

B. Wrong: "raised" is used for a building in the sense of erecting it, but "founded" is the paper's intended answer for a mosque.

C. Wrong: "created" is not the usual verb for founding a mosque.

D. Wrong: "established" is used for an institution, not for building a mosque. (Option A

ed", a misprint of "Founded", corrected as documented in the reviewed file.)

Note: Filed option A read "Founed" (misprint in the source reproduction); corrected to "Founded" as documented in the reviewed file.

Question 49 English

He was ---------- of theft in the court.

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

A. Wrong: "charged with theft" is correct English, but the paper's intended answer is "accused of theft" (see D).

B. Wrong: "reported of theft" is not idiomatic.

C. Wrong: "blamed of theft" is not idiomatic (one is "blamed for" something).

D. Correct: "accused of theft" is the idiom. (Option D prints "Acused", a misprint of "Accused"; corrected as documented in the reviewed file.)

Note: Filed option D read "Acused" (misprint in the source reproduction); corrected to "Accused" as documented in the reviewed file.

Question 50 English

He ---------- on a very extraordinary ambition

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

rrived on an ambition" is not idiomatic.

B. Also idiomatic: "decided on an ambition" means he chose it.

C. Wrong: "came on an ambition" is not idiomatic.

D. Correct (filed): "hit on an ambition" is the idiom for suddenly conceiving one. (PICK-ONE: D is filed as the most idiomatic phrasal verb; B is also idiomatic. The printed key records A, which is not idiomatic.)

Question 51 English

a. e-mail is a relatively new mean of communication

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

A. Wrong: "mean" should be "means", and "to communication" should be "of communication".

B. Correct: "means" is the noun (a means of communication) and the preposition is "of".

C. Wrong: "means to communication" should be "means of communication". (Only three options are printed; there is no option D. The printed key records C; it is wrong.)

Question 52 English

a. As she said, the computer was programmed by Mona.

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

A. Correct: "just like she said" keeps the original's simple past and is grammatical.

B. Wrong: "as like" is not standard English.

e past perfect "had said" needs an earlier past reference point, which there is none. (Only three options are printed; there is no option D. The printed key records C; it is wrong.)

Question 53 English

a. The remains of the body will thrown into the sea

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

A. Correct in content: "remains" is plural, so "were" is right; but it is identical to B, and the printed key records B.

B. Correct (filed): "remains" takes the plural "were", and "to sea" is the idiom for disposal at sea.

C. Wrong: "remains" is plural, so "was" is a subject-verb error. (Only three options are printed; there is no option D. A and B are identical.)

Question 54 English

a. A. they felt bad while leaving their friends

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

A. Wrong: "about" is doubled, and "about leaving" changes the original's "while leaving".

B. Wrong: it inserts "very" and changes "while" to "about".

C. Correct (filed): it preserves the original's "while leaving" and has no typo. (Only three options are printed; there is no option D. The printed key records A; it is wrong — A carries the doubled "about". Strictly, "felt bad" is the correct form rather than "felt badly", but C is

intended answer and the only option that preserves the original sentence.)

Question 55 English

a. Masood told me that he would hire more salesmen if he is in my position

- A. Masood told me that he would hire more salesmen if he had been in my position. ✓ **Correct answer**
- B. Masood told me that he would hire more salesmen if he has my position
- C. Masood told me that he would hire more salesmen if he had been in my position

A. Correct: the second conditional ("would hire") needs the past perfect ("had been") in the if-clause.

B. Wrong: the present tense "has" does not go with "would hire".

C. Correct in content, identical to A (only the final full stop is missing); the printed key records B, which is wrong. (Only three options are printed; there is no option D. A and C are identical.)

Question 56 English

AGHAST

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

A. Wrong: "critical" means fault-finding or crucial, not aghast.

B. Wrong: "reluctant" means unwilling, not aghast.

C. Wrong: "happy" is the opposite of aghast.

D. Correct: aghast means struck with horror or amazement. (The printed key records B; it

Question 57 English

INVIDIOUS

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

A. Wrong: "unbreakable" means cannot be broken, not invidious.

B. Wrong: "interesting" is not the meaning of invidious.

C. Correct: invidious means likely to arouse resentment or ill will, i.e. unpleasant.

D. Wrong: "fair" is the opposite of invidious.

Question 58 English

DISCERNMENT

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

A. Wrong: that is a government, not discernment.

B. Correct: discernment is the ability to judge well.

C. Wrong: that is encouragement, not discernment.

D. Wrong: that is indifference, not discernment. (The printed key records C; it is wrong. The stem prints "DISCERNMENI", a misprint of "DISCERNMENT"; filed clean.)

59 Physics

Which of the following radiations has the greatest penetrating power?

- A. Alpha
- B. Beta
- C. Gamma ✓ **Correct answer**
- D. X-rays

A. Wrong: alpha particles have the least penetrating power (stopped by paper).

B. Wrong: beta particles penetrate more than alpha but far less than gamma.

C. Correct: gamma rays have the greatest penetrating power of the four.

D. Wrong: X-rays penetrate well, but gamma rays penetrate further.

Question 60 English

NEOLOGISM

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

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

B. Wrong: that is a compliment, not a neologism.

C. Wrong: that is a synopsis, not a neologism.

D. Wrong: that is the opposite of a neologism (an old, not a new, expression). (The printed key records B; it is wrong.)

61 English

FURTIVE

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

A. Wrong: "furious" means very angry, not furtive.

B. Wrong: "familiar" means well known, not furtive.

C. Correct: furtive means secretive, stealthy, done by stealth.

D. Wrong: "easy" is not the meaning of furtive. (The printed key records A; it is wrong.)

Question 62 English

BOURGEOIS

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

A. Wrong: the bourgeoisie is the middle class, not the bureaucracy.

B. Correct: bourgeois means of the middle class.

C. Wrong: the upper class is the aristocracy, not the bourgeoisie.

D. Wrong: the lower class is the working class, not the bourgeoisie. (The printed key records D; it is wrong. Option C prints "Belonging o the upper class", a misprint of "Belonging to the upper class".)

63 English

RUMINATE

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

A. Wrong: "eat greedily" is gobbling, not ruminating (though ruminate comes from chewing the cud, its figurative meaning is to think deeply).

B. Correct: to ruminate is to think deeply about something.

C. Wrong: "work lazily" is not the meaning of ruminate.

D. Wrong: running fast has nothing to do with ruminating. (Option A prints "Eat greedly", a misprint of "Eat greedily"; corrected as documented in the reviewed file.)

Note: Filed option A read "Eat greedly" (misprint in the source reproduction); corrected to "Eat greedily" as documented in the reviewed file.

Question 64 English

EMBELLISH

- A. Beauty ✓ **Correct answer**
- B. Nominate
- C. Finish
- D. Weaken

A. Correct: to embellish is to beautify or decorate, so "beauty" is the closest option in meaning.

B. Wrong: "nominate" means to propose someone for a post, not to embellish.

C. Wrong: "finish" means to complete, not to embellish.

"weaken" is the opposite of embellishing in the sense of making something better.

Question 65 English

PARABLE

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

A. Wrong: that is not a meaning of parable (and it is not a coherent phrase).

B. Correct: a parable is a short allegorical story with a moral.

C. Wrong: "suitable" means appropriate, not a parable. (Only three options are printed; there is no option D. The printed key records A; it is wrong.)

Question 66 English

Number of bones in skull

- A. 22 ✓ **Correct answer**
- B. 26
- C. 24
- D. 28

A. Correct: the adult human skull has 22 bones (8 cranial and 14 facial).

B. Wrong: the skull has 22 bones, not 26.

C. Wrong: the skull has 22 bones, not 24.

D. Wrong: the skull has 22 bones, not 28. (This question is also in the independent student recall of this paper, "Bones in skull … 14 facial … = 22", confirming it belongs to the 7 August 2016 sitting.)

67 Biology

NADH produces how many ATP?

- A. 2 ATP
- B. 3 ATP ✓ **Correct answer**
- C. 4 ATP
- D. 6 ATP

A. Wrong: NADH yields 3 ATP in the textbook P/O convention, not 2.

B. Correct: each NADH gives 3 ATP through the electron transport chain (textbook convention).

C. Wrong: NADH gives 3 ATP, not 4.

D. Wrong: NADH gives 3 ATP, not 6. (The printed key records A; it is wrong. This question is also in the independent student recall of this paper, "NADH PRODUCED HOW MANY ATP /// 3 Atp".)

Question 68 Biology

How much ml blood is pumped by each contraction?

- A. 4500 ML
- B. 4000 ML
- C. 3500 ML
- D. 3000 ML

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the stroke volume (the blood pumped by one contraction) is about 70 ml, which is not among the options (4500, 4000, 3500 and 3000 ml are per-minute cardiac-output values, not per-contraction volumes). The printed key records A ("4500 ML") for the record.

A. Wrong: 4500 ml is roughly the cardiac output per minute, not the volume per

B. Wrong: also a per-minute figure, not a per-contraction one.

C. Wrong: also a per-minute figure.

D. Wrong: also a per-minute figure. (The stem prints "How much MI blood", read as "How much ml blood"; filed clean.)

Question 69 Biology

Fundography is relevant to

- A. Heart
- B. Liver
- C. Stomach
- D. Eyes

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — "Fundography" is not a recognised test name, so the keyed answer cannot be confirmed (the nearest real term, fundoscopy, is the examination of the fundus of the eye, which would point to D, not the keyed A). The printed key records A ("Heart") for the record.

A. Unverifiable: there is no recognised heart test called "fundography".

B. Unverifiable: "fundography" is not a liver test.

C. Unverifiable: "fundography" is not a stomach test (the fundus of the stomach is not examined by a test of this name).

D. Unverifiable as printed: fundoscopy examines the fundus of the eye, but the question does not say "fundoscopy".

70 Biology

Shape of tobacco mosaic virus is

- A. Spring shape
- B. Rod shape ✓ **Correct answer**
- C. Comma shape
- D. Spherical shape

A. Wrong: tobacco mosaic virus is not spring-shaped.

B. Correct: tobacco mosaic virus is a rod-shaped virus.

C. Wrong: the comma shape belongs to Vibrio bacteria, not to TMV.

D. Wrong: TMV is rod-shaped, not spherical. (The printed key records A; it is wrong. This question is also in the independent student recall of this paper, "Shape of tobacco mosaic virus? Ans is rod shaped".)

Question 71 Biology

Bile is used in

- A. Protein digestion
- B. Starch digestion
- C. Fat emulsification ✓ **Correct answer**
- D. Both a and

A. Wrong: bile does not digest protein.

B. Wrong: bile does not digest starch.

C. Correct: bile emulsifies fats, breaking large fat globules into small droplets for lipase to act on.

D. Wrong: the option is truncated ("Both a and ___") and neither A nor B is right. (The printed key records B; it is wrong. The stem prints "Bil", a misprint of "Bile"; filed clean.

nts" Fat emulcification", a misprint of "Fat emulsification"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Bile is use in fat emulsification".)

Note: Filed option C read "Fat emulcification" (misprint in the source reproduction); corrected to "Fat emulsification" as documented in the reviewed file.

Question 72 Biology

Amphibian heat has ------- chambers

- A. Two
- B. Three ✓ **Correct answer**
- C. Four
- D. Five

A. Wrong: a fish heart has two chambers, not an amphibian's.

B. Correct: an amphibian heart has three chambers (two atria and one ventricle).

C. Wrong: a four-chambered heart belongs to birds and mammals, not amphibians.

D. Wrong: no vertebrate heart has five chambers. (The printed key records A; it is wrong. The stem prints "Amphibian heat", a misprint of "Amphibian heart"; filed clean. This question is also in the independent student recall of this paper, "Amphibian heart has ---- chambers ... 3 chamber".)

Question 73 Biology

Plasma membrane is named so because it surrounds

- A. Semifluid cell contents ✓ **Correct answer**
- B. Protoplasm
- C. Cell wall
- D. None

led). the plasma membrane surrounds the semifluid cell contents, which is why it is called the plasma membrane.

B. Also correct: the protoplasm is the semifluid cell contents, so B says the same thing as A.

C. Wrong: the plasma membrane lies inside the cell wall, it does not surround it.

D. Wrong: A (and B) are correct. (PICK-ONE: A is filed per the printed key; B is synonymous with A. This question is also in the independent student recall of this paper, "Plasm membrane is named so because it surrounds A. semifluid cell contents B.protoplast C.cell wall".)

Question 74 Biology

Which of the following is not a basic unit of cell?

- A. Cell wall ✓ **Correct answer**
- B. Cell membrane
- C. Nucleus
- D. Ribosome

A. Correct: the cell wall is a protective outer layer, not a basic unit of the cell (the basic units are the cell membrane, the nucleus and the cytoplasm with its organelles).

B. Wrong: the cell membrane is a basic unit of the cell.

C. Wrong: the nucleus is a basic unit of the cell.

D. Wrong: the ribosome is a basic organelle of the cell. (This question is also in the independent student recall of this paper, "Which is not a basic unit of cell is Cell wall".)

Question 75 Biology

Group of cells performing same function

anelles

- B. Tissue ✓ **Correct answer**
- C. System
- D. Both a and b

A. Wrong: organelles are structures inside a cell, not a group of cells.

B. Correct: a group of cells performing the same function is a tissue.

C. Wrong: a system is a group of organs, not a group of cells.

D. Wrong: only B is correct. (The printed key records A; it is wrong. This question is also in the independent student recall of this paper, "Group of cell performing same function … tissue".)

Question 76 Biology

Amphibians live on

- A. Water
- B. Water and land ✓ **Correct answer**
- C. Land
- D. Air

A. Wrong: amphibians live on land as adults as well as in water.

B. Correct: amphibians live in water and on land (amphi = both, bios = life).

C. Wrong: amphibians also live in water (their larvae are aquatic).

D. Wrong: amphibians do not live in the air. (The printed key records A; it is wrong. This question is also in the independent student recall of this paper, "Amphibians live on? a) on water b) on land c) on water and on land".)

77 Biology

Mutations occur in

- A. DNA ✓ **Correct answer**
- B. Protein
- C. RNA
- D. All of these

A. Correct: mutations are changes in the genetic material, DNA.

B. Wrong: a mutation in DNA may change a protein, but the mutation itself occurs in DNA, not in protein.

C. Wrong: in the standard textbook sense the mutation occurs in DNA (RNA viruses aside).

D. Wrong: the mutation occurs in DNA, not in all three. (This is the same question as Q176 below, with the options shuffled; both are answered DNA.)

Question 78 Biology

DNA is found in which of the following?

- A. Golgi complex
- B. Lysosomes
- C. Mitochondria ✓ **Correct answer**
- D. Ribosomes

A. Wrong: the Golgi complex contains no DNA.

B. Wrong: lysosomes contain no DNA.

C. Correct: mitochondria contain their own DNA (besides the nuclear DNA).

D. Wrong: ribosomes contain RNA, not DNA. (The printed key records A; it is wrong.)

79 Biology

Which enzyme present in stomach curdles the milk?

- A. Rennin ✓ **Correct answer**
- B. Trypsin
- C. Pepsin
- D. Lipase

A. Correct: rennin (chymosin) curdles milk in the stomach of infants.

B. Wrong: trypsin digests protein in the small intestine, it does not curdle milk.

C. Wrong: pepsin digests protein in the stomach, it does not curdle milk.

D. Wrong: lipase digests fat, it does not curdle milk. (Option A prints "Ennin", a misprint of "Rennin"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Which enzyme present in stomach curdles the milk?")

Note: Filed option A read "Ennin" (misprint in the source reproduction); corrected to "Rennin" as documented in the reviewed file.

Question 80 Biology

Germ theory was given by

- A. Robert Koch ✓ **Correct answer**
- B. Antonie van leeuwenhoek
- C. Rober hooke
- D. Robert brown

A. Correct: the germ theory of disease is attributed to Robert Koch (and Louis Pasteur); of the options, Koch is the intended answer.

B. Wrong: Leeuwenhoek discovered microorganisms, but the germ theory is Koch's.

ooke discovered cells, not the germ theory.

D. Wrong: Brown discovered the nucleus, not the germ theory. (This question is also in the independent student recall of this paper, "Germ theory was given by Robert koch".)

Question 81 Biology

Hybrid black Guinea pigs are crossed with each other. The resulting offspring will be:

- A. All black
- B. All white
- C. 3 black, 1 white ✓ **Correct answer**
- D. 3 white, 1 black

A. Wrong: the cross Bb x Bb gives some white offspring.

B. Wrong: black is dominant, so most offspring are black.

C. Correct: Bb x Bb gives a 3:1 ratio of black to white.

D. Wrong: the ratio is 3 black to 1 white, not the reverse. (The printed key records A; it is wrong. This question is also in the independent student recall of this paper, "hybrid black Guinea pigs are crossed with each other. The resulting offsprings will be? ... 3 black, 1 white".)

Question 82 Biology

the enzyme in breast milk that causes the coagulation of milk or forms precipitates of milk as

- A. Rennin ✓ **Correct answer**
- B. Trypsin
- C. Amylase
- D. Lipase

A. Correct: rennin curdles (coagulates) milk.

/psin digests protein, it does not coagulate milk.

C. Wrong: amylase digests starch, it does not coagulate milk.

D. Wrong: lipase digests fat, it does not coagulate milk. (Option A prints "Renin", a misprint of "Rennin"; corrected as documented in the reviewed file. The stem prints "brest" and "conagulation", misprints of "breast" and "coagulation"; filed clean. This question is also in the independent student recall of this paper, "There is an other enzyme in breast milk that causes the coagulation of milk ... Renin".)

Note: Filed option A read "Renin" (misprint in the source reproduction); corrected to "Rennin" as documented in the reviewed file.

Question 83 Biology

The egg laying birds are called

- A. Oviparous ✓ **Correct answer**
- B. Viviparous
- C. Monotremes
- D. All of these

A. Correct: egg-laying animals are oviparous.

B. Wrong: viviparous animals give birth to live young.

C. Wrong: monotremes are egg-laying mammals, not birds.

D. Wrong: only A is correct. (This question is also in the independent student recall of this paper, "What are egg laying birds called".)

Question 84 Biology

Which of the following have both external and internal digestion?

- A. Hydra ✓ **Correct answer**

- C. Cockroach
- D. All of these

A. Correct: Hydra digests extracellularly in its gastrovascular cavity and intracellularly in its gastrodermal cells — the textbook example of both.

B. Wrong as the paper's answer: planaria also digests both ways, but the textbook example for this question is Hydra.

C. Wrong: a cockroach digests extracellularly in its gut only.

D. Wrong: the cockroach does not have both. (This question is also in the independent student recall of this paper, "Which of the following have both external and internal digestion A. Hydra B planaria C. Cockroach".)

Question 85 Biology

Milk drinking babies have an additional enzyme called

- A. Rennin ✓ **Correct answer**
- B. Amylase
- C. Lipase
- D. None

A. Correct: milk-drinking babies have rennin, which curdles milk.

B. Wrong: amylase digests starch, it is not the milk enzyme.

C. Wrong: lipase digests fat, it is not the milk-curdling enzyme.

D. Wrong: rennin is present. (Option A prints "Renine", a misprint of "Rennin"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Milk drinking babies have this additional enzyme A.renin".)

Note: Filed option A read "Renine" (misprint in the source reproduction); corrected to

documented in the reviewed file.

Question 86 Biology

Egg laying mammals are called

- A. Prototheria ✓ **Correct answer**
- B. Protozoa
- C. Chordata
- D. Monotremes

A. Correct (filed): the egg-laying mammals belong to the subclass Prototheria.

B. Wrong: protozoa are single-celled organisms, not mammals.

C. Wrong: Chordata is the whole phylum, not the egg-laying mammals.

D. Also correct: the monotremes are the egg-laying mammals (Prototheria is their subclass). (PICK-ONE: A is filed per the printed key; D is also correct. This question is also in the independent student recall of this paper, "Egg laying mammals...??? A:prototheria".)

Question 87 Biology

Aerobic respiration results in how many ATP?

- A. 2
- B. 36 ✓ **Correct answer**
- C. 18
- D. 32

A. Wrong: 2 ATP is the net gain of glycolysis alone, not of aerobic respiration.

B. Correct: aerobic respiration yields 36 ATP net in the textbook convention.

C. Wrong: aerobic respiration yields 36 ATP, not 18.

D. Wrong: 32 is the modern P/O value, but the textbook convention used by this paper is

ted key records A; it is wrong. This question is also in the independent student recall of this paper, "Respiration results in how many ATPs ... A:36".)

Question 88 Biology

Which process takes place during the movement of glucose from body fluid to blood?

- A. Endosmosis
- B. Osmosis
- C. Active transport
- D. Facilitated diffusion ✓ **Correct answer**

A. Wrong: endosmosis is the movement of water into a cell, not of glucose into blood.

B. Wrong: osmosis is the movement of water, not of glucose.

C. Wrong: glucose moves from body fluid to blood down its concentration gradient by facilitated diffusion, not by active transport.

D. Correct: glucose crosses into the blood through carrier proteins by facilitated diffusion. (The printed key records A; it is wrong. Option A prints "Endosmois", a misprint of "Endosmosis"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "When glucose moves from body fluid ti blood which process takes place endosmosis, active transport, osmosis, facilitated diffusion".)

Note: Filed option A read "Endosmois" (misprint in the source reproduction); corrected to "Endosmosis" as documented in the reviewed file.

Question 89 Biology

Ecological succession starting from drylands is

- A. Xerosere ✓ **Correct answer**
- B. Hydrophytes
- C. Hallphytes

A. Correct: a xerosere is the succession that starts on dry land.

B. Wrong: hydrophytes are water plants, and a hydrosere starts in water, not on dry land.

C. Wrong: halophytes are salt-tolerant plants, not a dry-land succession.

D. Wrong: only A is correct. (This question is also in the independent student recall of this paper, "Ecological succession starting from drylands....? Ans:xerosere". Option C prints "Hallphytes", a misprint of "Halophytes".)

Question 90 Biology

Organs of voice in birds:

- A. Larynx
- B. Pharynx
- C. Syrinx ✓ **Correct answer**
- D. Both a and c

A. Wrong: in birds the larynx is not the organ of voice.

B. Wrong: the pharynx is a passage for food and air, not the voice organ.

C. Correct: the syrinx, at the base of the trachea, is the bird's organ of voice.

D. Wrong: only the syrinx is the voice organ. (The printed key records A; it is wrong. Option C prints "Spinx", a misprint of "Syrinx"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Organ of voice in bird Larynx Pharynx Syrnx".)

Note: Filed option C read "Spinx" (misprint in the source reproduction); corrected to "Syrinx" as documented in the reviewed file.

91 Biology

Treponema pallidum causes

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

A. Correct: Treponema pallidum is the bacterium that causes syphilis.

B. Wrong: gonorrhea is caused by Neisseria gonorrhoeae, not by Treponema pallidum.

C. Wrong: AIDS is caused by the HIV virus, not by Treponema pallidum.

D. Wrong: herpes is caused by the herpes simplex virus, not by Treponema pallidum. (The stem prints "Treponemma palladium", a misprint of "Treponema pallidum"; filed clean. Options C and D print "Aids" and "Hepes", misprints of "AIDS" and "Herpes"; corrected as documented in the reviewed file.)

Note: Filed option C read "Aids" (misprint in the source reproduction); corrected to "AIDS" as documented in the reviewed file. Filed option D read "Hepes" (misprint in the source reproduction); corrected to "Herpes" as documented in the reviewed file.

Question 92 Biology

Lamarck is best known for his theory of

- A. Inheritance
- B. Dominance
- C. Inheritance of acquired characteristics ✓ **Correct answer**
- D. All of the above

A. Wrong as the paper's answer: inheritance alone is too general — Lamarck's theory is specifically the inheritance of acquired characteristics.

dominance is a Mendelian concept, not Lamarck's.

C. Correct: Lamarck held that characters acquired during life (by use and disuse) are passed to offspring.

D. Wrong: only C is Lamarck's theory. (The printed key records A; it is wrong. The stem prints "Lamark", a misprint of "Lamarck"; filed clean. This question is also in the independent student recall of this paper, "Lamarck theory is??? A: use and disuse of organ".)

Question 93 Biology

Commercial method of producing millions of seedlings in limited time?

- A. Parthenogenesis
- B. Parthenocarpy
- C. Cutting ✓ **Correct answer**
- D. Grafting

A. Wrong: parthenogenesis is the development of an egg without fertilisation; it does not produce seedlings commercially.

B. Wrong: parthenocarpy is fruit formation without fertilisation; it does not produce seedlings.

C. Correct (filed): cuttings are the commercial vegetative method for producing large numbers of seedlings quickly.

D. Wrong: grafting joins a scion to a stock, one plant at a time; it is not the mass-seedling method. (The printed key records A; it is wrong. The stem prints "Commereial" and "million", misprints of "Commercial" and "millions"; filed clean. This question is also in the independent student recall of this paper, "Which of these technique used to produce commercial seedlings in millions... Tissue culture" — tissue culture is the mass method, but it is not among the options, so the paper's intended answer is cutting.)

94 Biology

Cell wall is synthesized by

- A. Cellulose ✓ **Correct answer**
- B. Cell
- C. Ribosomes
- D. Penicillin binding protein

A. Correct (filed): the plant cell wall is made of cellulose, and the paper's intended answer is the wall's material.

B. Wrong as the paper's answer: the cell synthesizes the wall, but the paper asks for the wall's material, which is cellulose.

C. Wrong: ribosomes synthesize proteins, not the cell wall.

D. Wrong: penicillin-binding proteins are involved in bacterial wall synthesis, not in the plant cell wall. (This question is also in the independent student recall of this paper, "Cell wall is made up of Cellulose".)

Question 95 Biology

In tissue culture cells are held together by

- A. Callus ✓ **Correct answer**
- B. Adhesive
- C. Both
- D. None

A. Correct: in tissue culture the cells form a callus, the mass of undifferentiated cells that holds them together.

B. Wrong: no adhesive holds tissue-culture cells together.

C. Wrong: only A is correct.

e callus holds them together. (Option A prints "Calluls", a misprint of "Callus"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Callus is made by the process of..... Tissue culture".)

Note: Filed option A read "Calluls" (misprint in the source reproduction); corrected to "Callus" as documented in the reviewed file.

Question 96 Biology

Thyroid gland requires high amount of

- A. Phosphate
- B. Calcium
- C. Iodine ✓ **Correct answer**
- D. Sodium

A. Wrong: the thyroid does not require a high amount of phosphate.

B. Wrong: the thyroid does not require a high amount of calcium.

C. Correct: the thyroid needs iodine to make the hormones thyroxine and triiodothyronine.

D. Wrong: the thyroid does not require a high amount of sodium. (The printed key records A; it is wrong. This question is also in the independent student recall of this paper, "Which gland in man is connected with thyroid gland A.pituitary B.pancreas C.adrenal D.parathyroid" — the recall's option set differs, but the iodine answer is the same fact.)

Question 97 Biology

Which of the following is not the function of cerebrum?

- A. Voluntary digestion ✓ **Correct answer**
- B. Thinking
- C. Intelligence

A. Correct (filed): digestion is not a function of the cerebrum — it is controlled by the autonomic nervous system, not by voluntary thought.

B. Wrong: thinking IS a function of the cerebrum.

C. Wrong: intelligence IS a function of the cerebrum.

D. Wrong: the cerebrum controls voluntary movement of the skeletal muscles, so that IS one of its functions. (Options A and C print "Volunteer digestion" and "Intelligenece", misprints of "Voluntary digestion" and "Intelligence"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Which part of brain controls voluntary digestion? Cerebrum? Hypothalamus?".)

Note: Filed option A read "Volunteer digestion" (misprint in the source reproduction); corrected to "Voluntary digestion" as documented in the reviewed file. Filed option C read "Intelligenece" (misprint in the source reproduction); corrected to "Intelligence" as documented in the reviewed file.

Question 98 Biology

Which of the following is the function of adrenalin?

- A. To increase breathing rate
- B. To increase heart rate
- C. To increase calcium level in blood
- D. Both A and B ✓ **Correct answer**

A. Correct in content: adrenalin does raise the breathing rate, but it is only part of the answer.

B. Correct in content: adrenalin does raise the heart rate, but it is only part of the answer.

C. Wrong: adrenalin does not raise the blood calcium level.

led). adrenalin raises both the breathing rate and the heart rate. (The printed key records B; it is wrong — it gives only half the answer. Options A and D print "To increase breating rate" and "Both A and", misprints of "To increase breathing rate" and "Both A and B"; corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Which of the following is the stress hormone? Ans is Adrenaline".)

Note: Filed option A read "To increase breating rate" (misprint in the source reproduction); corrected to "To increase breathing rate" as documented in the reviewed file. Filed option D read "Both A and" (misprint in the source reproduction); corrected to "Both A and B" as documented in the reviewed file.

Question 99 Biology

Hepatic and pancreatic secretions are also stimulated by a hormone called

- A. Gastrin
- B. Secretin ✓ **Correct answer**
- C. Insulin
- D. Glucagon

A. Wrong as the paper's answer: gastrin stimulates gastric (stomach) secretion, not the liver and pancreas.

B. Correct: secretin stimulates the liver and the pancreas to release their secretions.

C. Wrong: insulin lowers blood sugar; it does not stimulate hepatic and pancreatic secretions.

D. Wrong: glucagon raises blood sugar; it does not stimulate these secretions. (The printed key records A; it is wrong. The printed stem merges a second question ("Antibodies are actually ...") into this one; the options belong to the hormone question, so the stem is filed as the hormone question and the merge is recorded. This question is also in the independent student recall of this paper, "Hepatic and pancreatic secretions are

ted by a hormone called: A:Secretin B:Gastrin C:Cholecystokinin".)

Question 100 Chemistry

The molecular formula of glucose is

- A. C6H12O6
- B. C6H12O6 ✓ **Correct answer**
- C. C12H22O11
- D. C6H12O6

A. Correct in content: glucose is C6H12O6 — but it is identical to B and D, and the printed key records B.

B. Correct (filed): glucose is C6H12O6.

C. Wrong: C12H22O11 is sucrose, not glucose.

D. Correct in content: glucose is C6H12O6 — but it is identical to A and B, and the printed key records B. (PICK-ONE: A, B and D are identical; B is filed per the printed key. The printed options read "CIHIIOI" (A, B and D) and "CIIHIIOII" (C); the subscripts are lost in the reproduction and are restored as documented in the reviewed file.)

Note: Filed option A read "CIHIIOI" (misprint in the source reproduction); corrected to "C6H12O6" as documented in the reviewed file. Filed option B read "CIHIIOI" (misprint in the source reproduction); corrected to "C6H12O6" as documented in the reviewed file. Filed option C read "CIIHIIOII" (misprint in the source reproduction); corrected to "C12H22O11" as documented in the reviewed file. Filed option D read "CIHIIOI" (misprint in the source reproduction); corrected to "C6H12O6" as documented in the reviewed file.

Question 101 Chemistry

Which of the following is NOT a disaccharide?

- A. Maltose

- C. Lactose
- D. Glucose ✓ **Correct answer**

A. Wrong: maltose IS a disaccharide (two glucose units), so it is not the answer.

B. Wrong: sucrose IS a disaccharide (glucose + fructose).

C. Wrong: lactose IS a disaccharide (glucose + galactose).

D. Correct: glucose is a monosaccharide, not a disaccharide.

Question 102 Chemistry

The bond angle in a water molecule is approximately

- A. 180°
- B. 120°
- C. 109.5°
- D. 104.5° ✓ **Correct answer**

A. Wrong: 180° is the angle of a linear molecule, not of water.

B. Wrong: 120° is the angle of a trigonal planar molecule, not of water.

C. Wrong: 109.5° is the tetrahedral angle; water is bent at about 104.5° because its two lone pairs compress the H–O–H angle.

D. Correct: the H–O–H bond angle in water is about 104.5°.

Question 103 Chemistry

Which of the following is the strongest base?

- A. NaOH ✓ **Correct answer**
- B. Ca(OH)2
- C. NH4OH

A. Correct: sodium hydroxide is the strongest base of the four.

B. Wrong: calcium hydroxide is a strong base, but weaker than NaOH.

C. Wrong: ammonium hydroxide is a weak base.

D. Wrong: magnesium hydroxide is a strong base, but weaker than NaOH. (Options B, C and D print "Ca(OH)I", "NHIOH" and "Mg(OH)I" — the subscripts are lost in the reproduction; corrected to Ca(OH)2, NH4OH and Mg(OH)2 as documented in the reviewed file.)

Note: Filed option B read "Ca(OH)I" (misprint in the source reproduction); corrected to "Ca(OH)2" as documented in the reviewed file. Filed option C read "NHIOH" (misprint in the source reproduction); corrected to "NH4OH" as documented in the reviewed file. Filed option D read "Mg(OH)I" (misprint in the source reproduction); corrected to "Mg(OH)2" as documented in the reviewed file.

Question 104 Chemistry

Electrolysis of brine produces chlorine at the

- A. Cathode
- B. Anode ✓ **Correct answer**
- C. Both electrodes
- D. Neither electrode

A. Wrong: hydrogen gas is produced at the cathode during the electrolysis of brine.

B. Correct: chloride ions are oxidised to chlorine gas at the anode.

C. Wrong: chlorine is produced only at the anode.

D. Wrong: chlorine is produced at the anode.

105 Chemistry

The catalyst used in Haber's process for manufacture of ammonia is

- A. Platinum
- B. Iron ✓ **Correct answer**
- C. Vanadium pentoxide
- D. Nickel

A. Wrong: platinum is the catalyst of the Ostwald process (nitric acid), not of the Haber process.

B. Correct: finely divided iron catalyses the Haber process ($N_2 + 3H_2 \rightarrow 2NH_3$).

C. Wrong: vanadium pentoxide is the catalyst of the Contact process (sulphuric acid).

D. Wrong: nickel is used in hydrogenation, not in the Haber process.

Question 106 Chemistry

The reaction of an acid with a base to form salt and water is called

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

A. Wrong: oxidation is the loss of electrons, not an acid–base reaction.

B. Wrong: reduction is the gain of electrons, not an acid–base reaction.

C. Correct: acid + base → salt + water is a neutralization reaction.

D. Wrong: hydrolysis is a reaction with water, not an acid–base neutralization.

107 Chemistry

Which of the following has the highest electronegativity?

- A. O
- B. N
- C. F ✓ **Correct answer**
- D. Cl

A. Wrong: oxygen's electronegativity is 3.44, less than fluorine's 3.98.

B. Wrong: nitrogen's electronegativity is 3.04.

C. Correct: fluorine is the most electronegative element (3.98).

D. Wrong: chlorine's electronegativity is 3.16.

Question 108 Chemistry

The pH of 0.001 M HCl solution is

- A. 1
- B. 2
- C. 3 ✓ **Correct answer**
- D. 4

A. Wrong: pH 1 is a 0.1 M solution, ten times stronger.

B. Wrong: pH 2 is a 0.01 M solution.

C. Correct: pH = -log[H+] = -log(0.001) = 3.

D. Wrong: pH 4 is a 0.0001 M solution.

Question 109 Chemistry

Which of the following is a thermosetting polymer?

- B. Polystyrene
- C. Bakelite ✓ **Correct answer**
- D. Nylon

A. Wrong: polyethylene is a thermoplastic (it softens on heating).

B. Wrong: polystyrene is a thermoplastic.

C. Correct: bakelite is a thermosetting polymer (it sets permanently on heating).

D. Wrong: nylon is a thermoplastic.

Question 110 Chemistry

The hybridization of carbon in acetylene (ethyne) is

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

A. Wrong: sp^3 is the hybridisation of alkanes (single bonds), not of ethyne.

B. Wrong: sp^2 is the hybridisation of alkenes (double bonds), not of ethyne.

C. Correct: each carbon in ethyne (HC≡CH) is sp hybridised, with a triple bond.

D. Wrong: sp^3d is not a hybridisation of carbon in ethyne.

Question 111 Chemistry

Which of the following is an aldehyde?

- A. CH3COCH3
- B. HCHO ✓ **Correct answer**
- C. CH3COOH

A. Wrong: acetone is a ketone, not an aldehyde.

B. Correct: formaldehyde is an aldehyde.

C. Wrong: acetic acid is a carboxylic acid, not an aldehyde.

D. Wrong: methanol is an alcohol, not an aldehyde. (Options A, C and D print "CHICOCHI", "CHICOOH" and "CHIOH" — the subscripts are lost in the reproduction; corrected to CH3COCH3, CH3COOH and CH3OH as documented in the reviewed file.)

Note: Filed option A read "CHICOCHI" (misprint in the source reproduction); corrected to "CH3COCH3" as documented in the reviewed file. Filed option C read "CHICOOH" (misprint in the source reproduction); corrected to "CH3COOH" as documented in the reviewed file. Filed option D read "CHIOH" (misprint in the source reproduction); corrected to "CH3OH" as documented in the reviewed file.

Question 112 Biology

Proteins are polymers of

- A. Nucleotides
- B. Monosaccharides
- C. Fatty acids
- D. Amino acids ✓ **Correct answer**

A. Wrong: nucleotides are the monomers of nucleic acids, not of proteins.

B. Wrong: monosaccharides are the monomers of polysaccharides, not of proteins.

C. Wrong: fatty acids are components of lipids, not the monomers of proteins.

D. Correct: proteins are polymers of amino acids joined by peptide bonds.

113 Biology

The enzyme that catalyzes the hydrolysis of starch is

- A. Lipase
- B. Protease
- C. Amylase ✓ **Correct answer**
- D. Nuclease

A. Wrong: lipase hydrolyses lipids, not starch.

B. Wrong: protease hydrolyses proteins, not starch.

C. Correct: amylase hydrolyses starch into sugars.

D. Wrong: nuclease hydrolyses nucleic acids, not starch.

Question 114 Biology

Which of the following is NOT a purine base?

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

A. Wrong: adenine IS a purine base, so it is not the answer.

B. Wrong: guanine IS a purine base.

C. Correct: thymine is a pyrimidine base, not a purine.

D. Wrong: both adenine and guanine are purines.

Question 115 Biology

The total number of bones in an adult human body is

- B. 206 ✓ **Correct answer**
- C. 216
- D. 226

A. Wrong: the adult skeleton has 206 bones, not 196.

B. Correct: an adult human has 206 bones.

C. Wrong: the adult skeleton has 206 bones, not 216.

D. Wrong: the adult skeleton has 206 bones, not 226.

Question 116 Biology

Which of the following is the longest bone in the human body?

- A. Tibia
- B. Fibula
- C. Femur ✓ **Correct answer**
- D. Humerus

A. Wrong: the tibia (shin bone) is the second-longest bone, not the longest.

B. Wrong: the fibula is the thin bone of the lower leg, much shorter than the femur.

C. Correct: the femur (thigh bone) is the longest and strongest bone in the body.

D. Wrong: the humerus is the upper-arm bone, shorter than the femur.

Question 117 Biology

The functional unit of the nervous system is the

- A. Neuroglia
- B. Neuron ✓ **Correct answer**
- C. Synapse

A. Wrong: neuroglia are the supporting cells of the nervous system, not its functional unit.

B. Correct: the neuron (nerve cell) is the structural and functional unit of the nervous system.

C. Wrong: a synapse is the junction between two neurons, not the functional unit.

D. Wrong: an axon is one part of a neuron, not the functional unit itself.

Question 118 Biology

Which part of the brain controls balance and coordination?

- A. Cerebrum
- B. Medulla oblongata
- C. Cerebellum ✓ **Correct answer**
- D. Hypothalamus

A. Wrong: the cerebrum controls thinking, memory and voluntary movement, not balance.

B. Wrong: the medulla controls heartbeat and breathing, not balance.

C. Correct: the cerebellum controls balance, posture and coordination.

D. Wrong: the hypothalamus controls hunger, thirst and body temperature, not balance.

Question 119 Biology

The normal human body temperature in Celsius is

- A. 35°C
- B. 36°C
- C. 37°C ✓ **Correct answer**
- D. 38°C

35°C is below normal body temperature (hypothermia).

B. Wrong: 36°C is below the normal 37°C.

C. Correct: normal human body temperature is about 37°C.

D. Wrong: 38°C is a fever, above normal.

Question 120 Biology

Which of the following is the largest gland in the human body?

- A. Pancreas
- B. Thyroid
- C. Liver ✓ **Correct answer**
- D. Adrenal

A. Wrong: the pancreas is much smaller than the liver.

B. Wrong: the thyroid is a small gland in the neck.

C. Correct: the liver is the largest gland (and the largest internal organ) in the human body.

D. Wrong: the adrenal glands are small glands above the kidneys.

Question 121 Biology

The process of fertilization in humans normally occurs in the

- A. Uterus
- B. Vagina
- C. Ovary
- D. Fallopian tube ✓ **Correct answer**

A. Wrong: the fertilised egg implants in the uterus, but fertilisation itself does not happen there.

e vagina is the passage for sperm, not the site of fertilisation.

C. Wrong: the egg is released from the ovary, but fertilisation happens after it enters the tube.

D. Correct: fertilisation normally occurs in the fallopian tube (oviduct).

Question 122 Biology

Which of the following hormones is responsible for 'fight or flight' response?

- A. Insulin
- B. Thyroxine
- C. Adrenaline ✓ **Correct answer**
- D. Cortisol

A. Wrong: insulin lowers blood sugar; it does not cause the fight-or-flight response.

B. Wrong: thyroxine regulates the metabolic rate; it is not the fight-or-flight hormone.

C. Correct: adrenaline (epinephrine) prepares the body for fight or flight.

D. Wrong: cortisol is a stress hormone, but the immediate fight-or-flight response is driven by adrenaline.

Question 123 Biology

The number of pairs of cranial nerves in humans is

- A. 10
- B. 12 ✓ **Correct answer**
- C. 14
- D. 31

A. Wrong: there are 12 pairs of cranial nerves, not 10.

B. Correct: humans have 12 pairs of cranial nerves.

ere are 12 pairs, not 14.

D. Wrong: 31 is the number of pairs of spinal nerves, not cranial nerves.

Question 124 Biology

Which of the following is NOT found in plant cells?

- A. Cell wall
- B. Chloroplast
- C. Centriole ✓ **Correct answer**
- D. Vacuole

A. Wrong: plant cells DO have a cell wall, so it is not the answer.

B. Wrong: plant cells DO have chloroplasts.

C. Correct: plant cells do not have centrioles (they are found in animal cells).

D. Wrong: plant cells DO have a large central vacuole.

Question 125 Biology

The opening and closing of stomata is controlled by

- A. Epidermal cells
- B. Guard cells ✓ **Correct answer**
- C. Mesophyll cells
- D. Palisade cells

A. Wrong: ordinary epidermal cells do not open and close the stomata.

B. Correct: the two guard cells around each stoma change shape to open and close it.

C. Wrong: mesophyll cells carry out photosynthesis, they do not control the stomata.

D. Wrong: palisade cells are photosynthetic cells, they do not control the stomata.

126 Biology

Which of the following is an example of asexual reproduction in plants?

- A. Pollination
- B. Fertilization
- C. Vegetative propagation ✓ **Correct answer**
- D. Seed dispersal

A. Wrong: pollination is part of sexual reproduction.

B. Wrong: fertilisation is sexual reproduction.

C. Correct: vegetative propagation (runners, bulbs, cuttings) is asexual reproduction in plants.

D. Wrong: seed dispersal spreads the products of sexual reproduction; it is not itself asexual reproduction.

Question 127 Biology

Transpiration occurs mainly through

- A. Roots
- B. Stem
- C. Stomata ✓ **Correct answer**
- D. Lenticels

A. Wrong: roots absorb water, they do not lose it by transpiration.

B. Wrong: only a small amount of water is lost through the stem.

C. Correct: most transpiration (about 90%) occurs through the stomata.

D. Wrong: only a small amount of transpiration occurs through lenticels.

128 Biology

Which tissue is responsible for transport of water in plants?

- A. Phloem
- B. Xylem ✓ **Correct answer**
- C. Parenchyma
- D. Collenchyma

A. Wrong: phloem transports food (sugars), not water.

B. Correct: xylem transports water and mineral salts from the roots to the leaves.

C. Wrong: parenchyma is a packing and storage tissue, not a water conductor.

D. Wrong: collenchyma is a supporting tissue, not a water conductor.

Question 129 Biology

The male reproductive organ in flowering plants is called

- A. Pistil
- B. Stamen ✓ **Correct answer**
- C. Carpel
- D. Sepal

A. Wrong: the pistil is the female reproductive organ.

B. Correct: the stamen (anther + filament) is the male reproductive organ.

C. Wrong: a carpel is the female unit of the pistil.

D. Wrong: a sepal is a protective leaf of the flower, not a reproductive organ.

Question 130 Biology

Which of the following is NOT a part of the pistil?

- B. Style
- C. Ovary
- D. Filament ✓ **Correct answer**

A. Wrong: the stigma IS part of the pistil (it receives the pollen).

B. Wrong: the style IS part of the pistil (it joins the stigma to the ovary).

C. Wrong: the ovary IS part of the pistil (it contains the ovules).

D. Correct: the filament is part of the stamen, not of the pistil.

Question 131 Biology

The theory of natural selection was proposed by

- A. Lamarck
- B. Mendel
- C. Darwin ✓ **Correct answer**
- D. Watson

A. Wrong: Lamarck proposed the inheritance of acquired characteristics, not natural selection.

B. Wrong: Mendel proposed the laws of inheritance, not natural selection.

C. Correct: Charles Darwin proposed the theory of natural selection.

D. Wrong: Watson (with Crick) proposed the double-helix structure of DNA.

Question 132 Biology

Fossils are evidences of

- A. Genetic variation
- B. Evolution ✓ **Correct answer**

- D. Adaptation

A. Wrong: fossils do not directly show genetic variation.

B. Correct: fossils are evidence of evolution — they show how life has changed over time.

C. Wrong: fossils do not show mutations.

D. Wrong: fossils show evolutionary change, not adaptation as such.

Question 133 Biology

Analogous organs show

- A. Divergent evolution
- B. Convergent evolution ✓ **Correct answer**
- C. Parallel evolution
- D. No evolution

A. Wrong: divergent evolution produces homologous organs (same origin, different function), not analogous ones.

B. Correct: analogous organs (same function, different origin) arise by convergent evolution.

C. Wrong: parallel evolution is the independent evolution of similar traits in related lineages, not what analogous organs show.

D. Wrong: analogous organs are a product of evolution.

Question 134 Biology

Which of the following is NOT an evidence of evolution?

- A. Fossils
- B. Comparative anatomy

- D. Mendel's laws ✓ **Correct answer**

A. Wrong: fossils ARE evidence of evolution, so they are not the answer.

B. Wrong: comparative anatomy IS evidence of evolution.

C. Wrong: embryology IS evidence of evolution.

D. Correct: Mendel's laws describe inheritance, they are not evidence of evolution.

Question 135 Biology

What is the name of the following compound?

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

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the structure diagram is absent from the reproduction, so the name cannot be checked; the printed key says A ("1-Ethyl-3, 4-dimethylcycloheptane") but the independent student recall of this paper says D ("4-ethyl-1,2-dimethylcyclohexane"), and the two cannot be reconciled without the structure. The printed key records A for the record.

A. Unverifiable: the structure is missing, so the ring size cannot be checked.

B. Unverifiable: the structure is missing.

C. Unverifiable: the structure is missing.

D. Unverifiable: the structure is missing, though the student recall gives this as the answer.

136 Chemistry

Which of the following compounds possesses at least one bond?

- A. CH4
- B. C2H2
- C. C2H4
- D. All of the above

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the stem's key qualifier is lost ("possesses at least one ___ bond"), so no answer can be defended: under any reading of the missing word the keyed A (CH4) is not defensible (methane has only single bonds). The printed key records A ("CH4") for the record.

A. Unverifiable: the missing qualifier decides the answer, and methane has only single bonds.

B. Unverifiable: the missing qualifier decides the answer (ethyne has a triple bond).

C. Unverifiable: the missing qualifier decides the answer (ethene has a double bond).

D. Unverifiable: the missing qualifier decides the answer. (The options print as "CH 4", "C H 2 2" and "C H 2 4" — the subscripts are lost in the reproduction; corrected to CH4, C2H2 and C2H4 as documented in the reviewed file.)

Question 137 Chemistry

Which of the following carboxylic acids will be the most acidic?

- A. CH3CHClCH2COOH
- B. CH3CH2CCl2COOH ✓ **Correct answer**
- C. CH3CH2CHClCOOH
- D. CH3CH2CH2COOH

A. Wrong: it has one chlorine, so it is weaker than the dichloro acid B.

two chlorine atoms exert a stronger electron-withdrawing effect, making it the strongest acid of the four.

C. Wrong: it has one chlorine, so it is weaker than B.

D. Wrong: it has no chlorine, so it is the weakest of the four. (The printed key records A; it is wrong. The printed options are garbled ("CH CHCICH COOH 3 2" etc.); corrected as documented in the reviewed file.)

Note: Filed option A read "CH CHCICH COOH 3 2" (misprint in the source reproduction); corrected to "CH3CHClCH2COOH" as documented in the reviewed file. Filed option B read "CH CH CCI COOH 3 2 2" (misprint in the source reproduction); corrected to "CH3CH2CCl2COOH" as documented in the reviewed file. Filed option C read "CH CH CHCICOOH 3 2" (misprint in the source reproduction); corrected to "CH3CH2CHClCOOH" as documented in the reviewed file. Filed option D read "CH CH CH COOH 3 2 2" (misprint in the source reproduction); corrected to "CH3CH2CH2COOH" as documented in the reviewed file.

Question 138 Chemistry

Which of the following cannot be used to convert butanoic acid to butanoyl chloride?

- A. PCl3
- B. PCl5
- C. CCl4 ✓ **Correct answer**
- D. SOCl2

A. Wrong: phosphorus trichloride converts a carboxylic acid to its acyl chloride, so it can be used.

B. Wrong: phosphorus pentachloride also converts a carboxylic acid to its acyl chloride.

C. Correct: carbon tetrachloride cannot convert a carboxylic acid to its acyl chloride.

D. Wrong: thionyl chloride is the standard reagent for converting a carboxylic acid to its

. (The printed key records A; it is wrong. The stem prints "butanoyl chlodie", a misprint of "butanoyl chloride"; filed clean. The options print as "PCI 3", "PCI 5", "CCI 4" and "SOCI 2"; corrected to PCl3, PCl5, CCl4 and SOCl2 as documented in the reviewed file.)

Note: Filed option A read "PCI 3" (misprint in the source reproduction); corrected to "PCl3" as documented in the reviewed file. Filed option B read "PCI 5" (misprint in the source reproduction); corrected to "PCl5" as documented in the reviewed file. Filed option C read "CCI 4" (misprint in the source reproduction); corrected to "CCl4" as documented in the reviewed file. Filed option D read "SOCI 2" (misprint in the source reproduction); corrected to "SOCl2" as documented in the reviewed file.

Question 139 Chemistry

Which of the following reagents will reduce butanoic acid to butanol?

- A. LiAlH4 ✓ **Correct answer**
- B. LiAlH4, H2O
- C. Mg(BH4)2
- D. All of the above

A. Correct (filed): lithium aluminium hydride reduces a carboxylic acid to its alcohol.

B. Also correct: LiAlH4 followed by a water workup is the same reagent in practice.

C. Also defensible: magnesium borohydride is a reducing agent that also reduces carboxylic acids to alcohols.

D. Also defensible: since A, B and C are all reducing agents for this conversion, "all of the above" follows. (PICK-ONE: A is filed per the printed key; B is the same reagent with its workup, C is another valid reducing agent, and D follows from them. The options print as "LiAIH 4", "LiAIH , H O 4 2" and "Mg(BH) 4 2"; corrected to LiAlH4, LiAlH4, H2O and Mg(BH4)2 as documented in the reviewed file.)

Note: Filed option A read "LiAIH 4" (misprint in the source reproduction); corrected to "LiAlH4" as documented in the reviewed file. Filed option B read "LiAIH , H O 4 2" (misprint

e reproduction), corrected to "LiAlH4, H2O" as documented in the reviewed file. Filed option C read "Mg(BH) 4 2" (misprint in the source reproduction); corrected to "Mg(BH4)2" as documented in the reviewed file.

Question 140 Biology

The kingdom that includes mushrooms and moulds is

- A. Protista
- B. Monera
- C. Fungi ✓ **Correct answer**
- D. Plantae

A. Wrong: Protista is the kingdom of single-celled eukaryotes, not of mushrooms and moulds.

B. Wrong: Monera is the kingdom of bacteria.

C. Correct: mushrooms and moulds belong to the kingdom Fungi.

D. Wrong: Plantae is the kingdom of plants.

Question 141 Chemistry

Which of the following has the highest electrical conductivity?

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

A. Wrong: sugar is a non-electrolyte, so its aqueous solution does not conduct.

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

C. Wrong: in solid NaCl the ions are fixed in the lattice, so it does not conduct.

rbon dioxide is a molecular gas and an insulator. (The printed key records A; it is wrong. Option C prints "Solid sodium choride", a misprint of "Solid sodium chloride".)

Note: Filed option C read "Solid sodium choride" (misprint in the source reproduction); corrected to "Solid sodium chloride" as documented in the reviewed file.

Question 142 Chemistry

Part of a polymer molecule has the following structure: -CH2-CH2-CH2-CH2-CH2-CH2-

- A. C2H4 ✓ **Correct answer**
- B. C2H6
- C. C3H6
- D. C3H8

A. Correct: the repeating unit -CH2-CH2- comes from ethene, C2H4, so the polymer is polyethylene.

B. Wrong: ethane is not the monomer of polyethylene.

C. Wrong: propene is the monomer of polypropylene, not polyethylene.

D. Wrong: propane is not the monomer of polyethylene. (The stem prints "has thef ollowing structure. -CH – CH – CH - CH - CH - CH 2 2 2 2 2 2"; it is filed as "has the following structure: -CH2-CH2-CH2-CH2-CH2-CH2-" and the restoration is recorded. The options print as "C H 2 4" etc.; corrected to C2H4, C2H6, C3H6 and C3H8 as documented in the reviewed file.)

Note: Filed option A read "C H 2 4" (misprint in the source reproduction); corrected to "C2H4" as documented in the reviewed file. Filed option B read "C H 2 6" (misprint in the source reproduction); corrected to "C2H6" as documented in the reviewed file. Filed option C read "C H 3 6" (misprint in the source reproduction); corrected to "C3H6" as documented in the reviewed file. Filed option D read "C H 3 8" (misprint in the source reproduction); corrected to "C3H8" as documented in the reviewed file.

143 Chemistry

The common features among the species CN-, CO and NO+ are

- A. Both order three and isoelectronic ✓ **Correct answer**
- B. Bond order three and weak field ligands
- C. Bond order two and – acceptors
- D. Isoelectronic and weak field ligands

A. Correct: CN-, CO and NO+ each have 14 electrons (isoelectronic) and a bond order of three.

B. Wrong: they do have bond order three, but they are strong-field ligands, not weak-field ones.

C. Wrong: their bond order is three, not two.

D. Wrong: they are isoelectronic, but they are strong-field ligands, not weak-field ones. (The stem prints "CN, CO and No"; it is filed as "CN-, CO and NO+" — the three isoelectronic species of bond order three — and the restoration is recorded.)

Question 144 Chemistry

Which of the following is the electronic configuration of K (Z = 19)?

- A. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2$
- B. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^1$
- C. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^5$
- D. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$ ✓ **Correct answer**

A. Wrong: that has 20 electrons, which is calcium, not potassium (Z = 19).

B. Wrong: that is the configuration of scandium (Z = 21), not potassium.

C. Wrong: that has 25 electrons, which is manganese, not potassium.

D. Correct: potassium (Z = 19) has 19 electrons, ending in $4s^1$. (The printed key records A; it

e stem prints "of K? 19", it is filed as "of K (Z = 19)". The configurations print with superscripts lost or run together ("3p64s1"); they are restored as documented in the reviewed file.)

Note: Filed option A read "$1s^2$, $2s^2$ 2p6, $3s^2$, 3p6, $4s^2$" (misprint in the source reproduction); corrected to "$1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^6$, $4s^2$" as documented in the reviewed file. Filed option B read "$1s^2$, $2s^2$ 2p6, $3s^2$ 3p6, 3d1" (misprint in the source reproduction); corrected to "$1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^6$, $3d^1$" as documented in the reviewed file. Filed option C read "$1s^2$, 2s2, 2p6, 3s2 3p6, 4s2 3d5" (misprint in the source reproduction); corrected to "$1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^6$, $4s^2$, $3d^5$" as documented in the reviewed file. Filed option D read "$1s^2$, $2s^2$, 2p6, $3s^2$, 3p64s1" (misprint in the source reproduction); corrected to "$1s^2$, $2s^2$, $2p^6$, $3s^2$, $3p^6$, $4s^1$" as documented in the reviewed file.

Question 145 Chemistry

At equilibrium, which of the following reactions is not affected by pressure?

- A. ( ) ( ) ( )
- B. ( ) ( ) ( )
- C. ( ) ( )
- D. ( ) ( ) ( )

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the four reaction equations are lost; only empty parentheses survive, so no answer can be checked. The printed key records A for the record.

A. Unverifiable: the reaction is missing.

B. Unverifiable: the reaction is missing.

C. Unverifiable: the reaction is missing.

D. Unverifiable: the reaction is missing.

146 Chemistry

The sum of all the exponents to which the molar concentration terms in the rate equation are raised defines

- A. Rate of reaction
- B. Order of reaction ✓ **Correct answer**
- C. Type of reaction
- D. Product of reaction

A. Wrong: the rate of reaction is the speed of the reaction, not the sum of the exponents.

B. Correct: the order of a reaction is the sum of the exponents (powers) of the concentration terms in its rate equation.

C. Wrong: the type of reaction is not defined by the exponents.

D. Wrong: the product is what the reaction makes, not the sum of the exponents. (The printed key records A; it is wrong. The stem prints with stray quotation marks; filed clean.)

Question 147 Chemistry

H_2 and Cl_2 do not react in the dark, but in the presence of light a vigorous reaction is initiated due to the formation of:

- A. Hydrogen free radical
- B. Chlorine free radical ✓ **Correct answer**
- C. Hydrogen chloride molecule
- D. Both hydrogen and chlorine free radicals

A. Wrong: light dissociates Cl_2 into chlorine radicals, not H_2 into hydrogen radicals.

B. Correct: light splits Cl_2 into $Cl\bullet$ radicals, which start the chain reaction with H_2.

C. Wrong: HCl is the product of the reaction, not the species that initiates it.

D. Wrong: only chlorine radicals are formed by the light to start the chain. (The printed key

is wrong. The stem prints "H and Cl do not react in the dark, but in the 2 2 presence of light a vigorous reaction is initiate"; it is filed as "H2 and Cl2 do not react in the dark, but in the presence of light a vigorous reaction is initiated" and the restoration is recorded.)

Question 148 Chemistry

The rate of gaseous reaction is given by K [A] [B]. If the volume of the vessel containing these gases is reduced to 1/4th of initial volume, the rate of reaction relative to the original rate would be:

- A. 16/1 ✓ **Correct answer**
- B. 1/16
- C. 4/1
- D. 1/8

A. Correct: reducing the volume to 1/4 makes each concentration 4 times greater, so the rate K[A][B] becomes 4 x 4 = 16 times the original.

B. Wrong: the rate increases, it does not fall to 1/16.

C. Wrong: both concentrations rise fourfold, so the rate rises sixteenfold, not fourfold.

D. Wrong: the rate increases sixteenfold, it does not fall.

Question 149 Chemistry

Solid NaCl is a bad conductor of electricity because:

- A. Solid NaCl is covalent
- B. In the solid state, there are no ions
- C. In solid NaCl, there is no migration of ions ✓ **Correct answer**
- D. In solid NaCl, there are no electrons

A. Wrong: solid NaCl is ionic, not covalent.

e ions are present in the solid, they are just fixed in the lattice.

C. Correct: the ions cannot move in the solid, so no current can flow.

D. Wrong: there are electrons in the solid, but they are not free to move. (The printed key records A; it is wrong. The stem and options print "NaCI"; filed as "NaCl". Option D prints "there are not electron"; corrected to "there are no electrons" as documented in the reviewed file.)

Note: Filed option A read "Solid NaCI is covalent" (misprint in the source reproduction); corrected to "Solid NaCl is covalent" as documented in the reviewed file. Filed option C read "In solid NaCI, there is no migration of ions" (misprint in the source reproduction); corrected to "In solid NaCl, there is no migration of ions" as documented in the reviewed file. Filed option D read "In solid NaCI, there are not electron" (misprint in the source reproduction); corrected to "In solid NaCl, there are no electrons" as documented in the reviewed file.

Question 150 Chemistry

At 25°C, the equivalent conductance at infinite dilution of HCl solution is 425 ohm^{-1} cm^2 $equiv^{-1}$ while its specific conductance is 3.825 ohm^{-1} cm^{-1}. If the apparent degree of dissociation is 90%, the normality of the solution is

- A. 0.9 N
- B. 1.0 N
- C. 1.1 N
- D. 1.2 N

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the printed numbers give a normality of 10 N (N = κ x 1000 / (α x Λ∞) = 3.825 x 1000 / (0.9 x 425)), which is not among the options (0.9, 1.0, 1.1, 1.2 N); the keyed A (0.9 N) is the degree of dissociation, not the normality. The printed key records A ("0.9 N") for the record.

e printed numbers give 10 N, not 0.9 N.

B. Wrong: the printed numbers give 10 N, not 1.0 N.

C. Wrong: the printed numbers give 10 N, not 1.1 N.

D. Wrong: the printed numbers give 10 N, not 1.2 N. (The stem prints "HCI", "425 oh1 cm2 equiv1", "3.825 ohm1 cm1" and "it specific conductance"; filed with the units restored as ohm^{-1} cm^{2} $equiv^{-1}$ and ohm^{-1} cm^{-1}, "HCl" and "its".)

Question 151 Chemistry

In an adiabatic process

- A. Pressure is maintained constant
- B. The gas is isothermally expanded
- C. There is perfect heat insulation ✓ **Correct answer**
- D. System exchanges heat with the surroundings

A. Wrong: constant pressure is an isobaric process, not an adiabatic one.

B. Wrong: isothermal expansion keeps the temperature constant, which is a different process.

C. Correct: an adiabatic process is one with no heat exchange with the surroundings, achieved by perfect heat insulation.

D. Wrong: that is the opposite of an adiabatic process. (The printed key records A; it is wrong.)

Question 152 Chemistry

Enthalpy of a compound is equal to its

- A. Heat of combustion
- B. Heat of formation ✓ **Correct answer**

t of solution

- D. Heat of dilution

A. Wrong: the heat of combustion is the heat released on burning, not the enthalpy of the compound.

B. Correct: the enthalpy of a compound is its (standard) heat of formation.

C. Wrong: the heat of solution is the heat change on dissolving, not the enthalpy of the compound.

D. Wrong: the heat of dilution is the heat change on diluting, not the enthalpy of the compound. (The printed key records A; it is wrong.)

Question 153 Chemistry

A mixture of ethyl and isopropyl iodides is heated with Na in dry ether. According to Wurtz reaction the product(s) obtained is / are.

- A. CH CH CH CH

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — only option A survives, garbled ("CH CH CH CH"), and options B, C and D are lost, so the Wurtz products cannot be checked. The printed key records A for the record.

A. Unverifiable: the printed option is garbled and the other three options are missing, so the answer cannot be checked. (The stem prints "with Na is dry ether"; filed as "with Na in dry ether".)

Question 154 Chemistry

3 moles of ethanol react with 1 mole of PBr3 to form 3 moles of bromoethane and 1 mole of X. Which of the following is X?

- A. H3PO4

- C. HPO3
- D. H3PO3 ✓ **Correct answer**

A. Wrong: phosphoric acid is not the product of this reaction.

B. Wrong: hypophosphorous acid is not the product of this reaction.

C. Wrong: metaphosphoric acid is not the product of this reaction.

D. Correct: 3 ROH + PBr3 → 3 RBr + H3PO3, so X is phosphorous acid. (The printed key records A; it is wrong. The stem prints "A moles of ethanol react with 1 mole of PBr to 3 form 3 moles"; it is filed as "3 moles of ethanol react with 1 mole of PBr3 to form 3 moles" and the restoration is recorded. The options print as "H PO 3 4" etc.; corrected to H3PO4, H3PO2, HPO3 and H3PO3 as documented in the reviewed file.)

Note: Filed option A read "H PO 3 4" (misprint in the source reproduction); corrected to "H3PO4" as documented in the reviewed file. Filed option B read "H PO 3 2" (misprint in the source reproduction); corrected to "H3PO2" as documented in the reviewed file. Filed option C read "HPO 3" (misprint in the source reproduction); corrected to "HPO3" as documented in the reviewed file. Filed option D read "H PO 3 3" (misprint in the source reproduction); corrected to "H3PO3" as documented in the reviewed file.

Question 155 Chemistry

The conversion of phenol to benzene in the presence of zinc involves

- A. Oxidation
- B. Reduction ✓ **Correct answer**
- C. Dihydroxylation
- D. Dehydrogenation

A. Wrong: phenol loses its hydroxyl group to become benzene — a reduction, not an oxidation.

nc dust reduces phenol to benzene (the C–O bond is replaced by C–H).

C. Wrong: dihydroxylation adds two hydroxyl groups, the opposite of this conversion.

D. Wrong: dehydrogenation removes hydrogen; this conversion adds hydrogen to the ring carbon. (The printed key records A; it is wrong.)

Question 156 Chemistry

Phenyl methyl ketone can be converted into ethyl benzene in one step by using:

- A. LiAlH4
- B. Zn(Hg) – HCl ✓ **Correct answer**
- C. NaBH4
- D. CH3MgI

A. Wrong as the paper's answer: lithium aluminium hydride reduces the ketone to the alcohol (1-phenylethanol), not to ethylbenzene.

B. Correct: Clemmensen reduction (zinc amalgam + HCl) converts the ketone directly to the alkane, ethylbenzene, in one step.

C. Wrong: sodium borohydride reduces the ketone to the alcohol, not to the alkane.

D. Wrong: methylmagnesium iodide is a Grignard reagent; it adds to the ketone rather than reducing it to the alkane. (The printed key records A; it is wrong. The options print as "LiAIH 4", "Zn(Hg) – HCI", "NaBH 4" and "CH Mgl 3"; corrected to LiAlH4, Zn(Hg) – HCl, NaBH4 and CH3MgI as documented in the reviewed file.)

Note: Filed option A read "LiAIH 4" (misprint in the source reproduction); corrected to "LiAlH4" as documented in the reviewed file. Filed option B read "Zn(Hg) – HCI" (misprint in the source reproduction); corrected to "Zn(Hg) – HCl" as documented in the reviewed file. Filed option C read "NaBH 4" (misprint in the source reproduction); corrected to "NaBH4" as documented in the reviewed file. Filed option D read "CH Mgl 3" (misprint in the source reproduction); corrected to "CH3MgI" as documented in the reviewed file.

157 Chemistry

Which of the following will not undergo aldol condensation?

- A. Acetaldehyde
- B. Propanaldehyde
- C. Benzaldehyde ✓ **Correct answer**
- D. Trideuteroacetaldehyde

A. Wrong: acetaldehyde has alpha-hydrogens, so it undergoes aldol condensation.

B. Wrong: propanaldehyde has alpha-hydrogens, so it undergoes aldol condensation.

C. Correct: benzaldehyde has no alpha-hydrogen, so it cannot undergo aldol condensation.

D. Wrong: it has alpha-deuteriums, so it can undergo aldol condensation. (The printed key records A; it is wrong. The stem prints "will no undergo aldolcondensation"; filed as "will not undergo aldol condensation".)

Question 158 Chemistry

Treatment of propionaldehyde with dilute NaOH solution gives:

- A. (( ) d.

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — only a garbled fragment of option A survives ("(( ) d.") and the aldol product structures are lost, so no answer can be checked. The printed key records A for the record.

A. Unverifiable: the product structure is lost. (The stem prints "Dil. The NaOH"; filed as "dilute NaOH".)

159 Chemistry

Which of the following solids is an example of a substance with a macromolecular structure?

- A. Aluminium chloride
- B. Ice
- C. Magnesium oxide
- D. Silicon (IV) oxide ✓ **Correct answer**

A. Wrong: aluminium chloride is a molecular (or ionic) solid, not a macromolecular one.

B. Wrong: ice is a molecular solid (water molecules held by hydrogen bonds).

C. Wrong: magnesium oxide is an ionic solid, not a macromolecular one.

D. Correct: quartz (silicon dioxide) has a giant covalent, macromolecular structure. (The printed key records A; it is wrong.)

Question 160 Chemistry

Which one of the following statements is true?

- A. All nitrates of Group II metals are decomposed by heat to give the oxide NO2 ✓ **Correct answer**
- B. Aqueous sodium nitrate is acidic to litmus
- C. Aqueous ammonium nitrate is alkaline to litmus
- D. The alkali metal nitrates are insoluble in water

A. Correct: Group II nitrates decompose on heating to the metal oxide, nitrogen dioxide and oxygen (2M(NO3)2 → 2MO + 4NO2 + O2).

B. Wrong: aqueous sodium nitrate is neutral, not acidic.

C. Wrong: aqueous ammonium nitrate is acidic, not alkaline.

D. Wrong: alkali metal nitrates are soluble in water. (The options print garbled ("give the

"In acidic", "litmu s", "isoluble"); corrected as documented in the reviewed file. This question is also in the independent student recall of this paper, "Group 2 nitrates statement".)

Note: Filed option A read "All nitrates of Group II metals are decomposed by heat to give the oxide NO 2" (misprint in the source reproduction); corrected to "All nitrates of Group II metals are decomposed by heat to give the oxide NO2" as documented in the reviewed file. Filed option B read "Aqueous sodium nitrate in acidic to litmus" (misprint in the source reproduction); corrected to "Aqueous sodium nitrate is acidic to litmus" as documented in the reviewed file. Filed option C read "Aqueous ammonium nitrate is alkaline to litmu s" (misprint in the source reproduction); corrected to "Aqueous ammonium nitrate is alkaline to litmus" as documented in the reviewed file. Filed option D read "The alkali metal nitrates are isoluble in water" (misprint in the source reproduction); corrected to "The alkali metal nitrates are insoluble in water" as documented in the reviewed file.

Question 161 Chemistry

Which property of the Group II elements (magnesium to barium) and their compounds increases with an increasing proton (atomic) number?

- A. The magnitude of the enthalpy change of hydration of the metal ion
- B. The pH of the aqueous chloride
- C. The solubility of the sulphate in water
- D. The stability of the carbonate to heat ✓ **Correct answer**

A. Wrong: the hydration enthalpy magnitude decreases down the group (the ions get larger).

B. Wrong as the paper's answer: the aqueous chlorides are essentially neutral salts, and their pH does not rise steadily down the group the way the carbonate stability does.

C. Wrong: the solubility of the Group II sulphates decreases down the group.

D. Correct: the carbonates become more thermally stable down Group II (larger cations

carbonate ion less). (The printed key records A; it is wrong. Option B prints "The pH of the aquous chloride", a misprint of "The pH of the aqueous chloride"; corrected as documented in the reviewed file.)

Note: Filed option B read "The pH of the aquous chloride" (misprint in the source reproduction); corrected to "The pH of the aqueous chloride" as documented in the reviewed file.

Question 162 Chemistry

The reduction of a nitrile produced a compound of formula C3H7NH2. Which one of the following compounds would be produced if the same nitrile was hydrolysed by heating with dilute hydrochloric acid?

- A. ( ) d. e.

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the options and structures are lost; only a garbled fragment ("( ) d. e.") of option A survives, so no answer can be checked. The printed key records A for the record.

A. Unverifiable: the product structure is lost. (The stem prints "The reduction of a nitrite produced as compound of formula C H NH . Which one of 3 7 2 the following compounds would be produced if the same nitrile was hydrolysed by heating with dilute hydrochloric acid? a. b."; it is filed as "The reduction of a nitrile produced a compound of formula C3H7NH2. Which one of the following compounds would be produced if the same nitrile was hydrolysed by heating with dilute hydrochloric acid?" and the restoration is recorded.)

Question 163 English

Choose the correct sentence:

- A. She don't know the answer
- B. She doesn't knows the answer

doesn't know the answer ✓ **Correct answer**

- D. She not know the answer

A. Wrong: "don't" does not go with "she" — it should be "doesn't".

B. Wrong: after "doesn't" the verb takes its base form ("know"), not "knows".

C. Correct: "doesn't" + base form "know" is the correct third-person singular negative.

D. Wrong: the auxiliary "does" is missing — it should be "She does not know the answer".

Question 164 English

The synonym of 'Gregarious' is

- A. Solitary
- B. Sociable ✓ **Correct answer**
- C. Hostile
- D. Timid

A. Wrong: "solitary" means liking to be alone — the opposite of gregarious.

B. Correct: gregarious means sociable, fond of company.

C. Wrong: "hostile" means unfriendly, not gregarious.

D. Wrong: "timid" means shy, not gregarious.

Question 165 Chemistry

An azeotropic mixture of two liquids has a boiling point higher than either of them when it

- A. Shows positive deviation from Raoult's law
- B. Shows negative deviation from Raoult's law ✓ **Correct answer**
- C. Shows ideal behavior
- D. Is saturated

positive deviation gives a minimum-boiling azeotrope, whose boiling point is lower than either component's.

B. Correct: negative deviation gives a maximum-boiling azeotrope, whose boiling point is higher than either component's.

C. Wrong: an ideal mixture shows no deviation and forms no azeotrope.

D. Wrong: saturation is not the condition for a maximum-boiling azeotrope. (The printed key records A; it is wrong. The stem prints "axeotropic"; filed as "azeotropic".)

Question 166 Chemistry

The osmotic pressure of equimolar solutions of BaCl2, NaCl and sucrose will be in the order:

- A. Sucrose > NaCl > BaCl2
- B. Sucrose > BaCl2 > NaCl
- C. NaCl > BaCl2 > Sucrose
- D. BaCl2 > NaCl > Sucrose ✓ **Correct answer**

A. Wrong: the order is reversed — BaCl2 gives the most particles, sucrose the fewest.

B. Wrong: sucrose gives the fewest particles, so it has the lowest osmotic pressure, not the highest.

C. Wrong: BaCl2 gives three particles per formula unit, NaCl only two, so BaCl2 has the higher osmotic pressure.

D. Correct: BaCl2 dissociates into three ions, NaCl into two, and sucrose does not dissociate, so the osmotic pressure order is BaCl2 > NaCl > sucrose. (The printed key records A; it is wrong. The stem prints "equimolar solution of BaCI , NaCI and sucrose will be in the order: 2"; filed as "equimolar solutions of BaCl2, NaCl and sucrose will be in the order:". The options print garbled ("Sucrose > naCI > BaCI 2" etc.); corrected as documented in the reviewed file.)

option A read "Sucrose > NaCI > BaCI 2" (misprint in the source reproduction); corrected to "Sucrose > NaCl > BaCl2" as documented in the reviewed file. Filed option B read "Sucrose > BaCl > NaCl 2" (misprint in the source reproduction); corrected to "Sucrose > BaCl2 > NaCl" as documented in the reviewed file. Filed option C read "NaCI > BaCI > Sucrose 2" (misprint in the source reproduction); corrected to "NaCl > BaCl2 > Sucrose" as documented in the reviewed file. Filed option D read "BaCI > NaCI > Sucrose 2" (misprint in the source reproduction); corrected to "BaCl2 > NaCl > Sucrose" as documented in the reviewed file.

Question 167 Chemistry

Impurities of lead in silver are removed by

- A. Parke's process ✓ **Correct answer**
- B. Solvay process
- C. Cyanide process
- D. Amalgamation process

A. Correct: the Parkes process removes lead from silver (zinc is added, the lead dissolves in the zinc, and the zinc–lead alloy is skimmed off).

B. Wrong: the Solvay process makes sodium carbonate, it does not purify silver.

C. Wrong: the cyanide process extracts gold and silver from their ores, it does not remove lead from silver.

D. Wrong: amalgamation uses mercury to extract metals, it does not remove lead from silver.

Question 168 Chemistry

Chromium dissolves in dilute H2SO4 to form [Cr(H2O)6]2+. The colour of the ion is:

- A. Blue ✓ **Correct answer**
- B. Yellow

- D. Pink

A. Correct: the hexaaquachromium(II) ion, [Cr(H2O)6]2+, is blue.

B. Wrong: the chromium(II) aqua ion is not yellow.

C. Wrong: the chromium(II) aqua ion is not brown.

D. Wrong: the chromium(II) aqua ion is not pink. (The stem prints "Chromium dissolves in dilute H SO to form 2 4 [Cr(H O)]2. The colour of the ion is: 2 6"; it is filed as "Chromium dissolves in dilute H2SO4 to form [Cr(H2O)6]2+. The colour of the ion is:" and the restoration is recorded.)

Question 169 Chemistry

Which of the following will react with water?

- A. CHCl3
- B. Cl3CCHO ✓ **Correct answer**
- C. CHI3
- D. ClCH2CH2Cl

A. Wrong: chloroform does not react with water under normal conditions.

B. Correct: chloral (trichloroacetaldehyde) reacts with water to form chloral hydrate, CCl3CH(OH)2.

C. Wrong: iodoform does not react with water.

D. Wrong: 1,2-dichloroethane does not react with water. (The printed key records A; it is wrong. The options print as "CHCI 3", "CI C CHO 3", "CHI 4" and "CICH CH CI 2 2"; corrected to CHCl3, Cl3CCHO, CHI3 and ClCH2CH2Cl as documented in the reviewed file.)

Note: Filed option A read "CHCI 3" (misprint in the source reproduction); corrected to "CHCl3" as documented in the reviewed file. Filed option B read "CI C CHO 3" (misprint in

reproduction); corrected to "Cl3CCHO" as documented in the reviewed file. Filed option C read "CHI 4" (misprint in the source reproduction); corrected to "CHI3" as documented in the reviewed file. Filed option D read "CICH CH CI 2 2" (misprint in the source reproduction); corrected to "ClCH2CH2Cl" as documented in the reviewed file.

Question 170 Chemistry

In the reaction of m-chlorotoluene with KNH2 in liquid NH3, the major product is

- A. O-toluidine
- B. M-toluidine
- C. P-toluidine
- D. P-chloroaniline

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation) — the keyed A (o-toluidine) cannot be confirmed: the benzyne mechanism for m-chlorotoluene gives a mixture and the major product is disputed (web sources conflict — one community answer says m-aminotoluene is major, another says o- and p-toluidine, and my own mechanism analysis gives p-toluidine), and the option set is identical to the classic p-chlorotoluene question whose answer is m-toluidine, suggesting the stem or the key is misprinted. The printed key records A ("O-toluidine") for the record.

A. Unverifiable: the benzyne mechanism for m-chlorotoluene gives a mixture and the major product is disputed.

B. Unverifiable: one community source says this is the major product, but it is not confirmed.

C. Unverifiable: my own mechanism analysis (3,4-benzyne favoured, attack at C4) gives this, but it is not confirmed.

D. Wrong: the chlorine is displaced by the amide, so the product is a toluidine, not a chloroaniline. (The stem prints "KNH in 2 liquid NH , the major product is 3"; it is filed as

uid NHS, the major product is and the restoration is recorded. The options print as "O-toludine", "M-toludine", "P-toludine" and "P-chloroanzr"; corrected to O-toluidine, M-toluidine, P-toluidine and P-chloroaniline as documented in the reviewed file.)

Question 171 English

Choose the correct passive voice of: 'The students completed the project.'

- A. The project was completed by the students. ✓ **Correct answer**
- B. The project is completed by the students.
- C. The project had completed by students.
- D. The project were completed by students.

A. Correct: the simple past "completed" becomes the simple past passive "was completed".

B. Wrong: "is completed" is present tense, but the original is past tense.

C. Wrong: "had completed" is active past perfect, and the passive needs "been" ("had been completed").

D. Wrong: "were" does not agree with the singular subject "project" — it should be "was".

Question 172 Chemistry

The order of reactivities of the following alkyl halides for a reaction is

- A. RF > RCl > RBr > RI
- B. RF > RBr > RCl > RI
- C. RCl > RBr > RF > RI
- D. RI > RBr > RCl > RF ✓ **Correct answer**

A. Wrong: fluoride is the least reactive alkyl halide, not the most.

B. Wrong: it also puts fluoride first, but fluoride is the least reactive.

e order is iodide > bromide > chloride > fluoride, not this.

D. Correct: alkyl halide reactivity follows the leaving-group order I > Br > Cl > F. (The printed key records A; it is wrong. The options print "RCI"; corrected to "RCl" as documented in the reviewed file.)

Note: Filed option A read "RF > RCI > RBr > RI" (misprint in the source reproduction); corrected to "RF > RCl > RBr > RI" as documented in the reviewed file. Filed option B read "RF > RBr > RCI > RI" (misprint in the source reproduction); corrected to "RF > RBr > RCl > RI" as documented in the reviewed file. Filed option C read "RCI > RBr > RF > RI" (misprint in the source reproduction); corrected to "RCl > RBr > RF > RI" as documented in the reviewed file. Filed option D read "RI > RBr > RCI > RF" (misprint in the source reproduction); corrected to "RI > RBr > RCl > RF" as documented in the reviewed file.

Question 173 Chemistry

Natural rain forms -------- in the presence of carbon dioxide in the air.

- A. Smog
- B. Ozone
- C. Carbonic acid ✓ **Correct answer**
- D. Chlorofluorocarbons

A. Wrong: smog is smoke mixed with fog, not what CO2 forms in rain.

B. Wrong: ozone is not formed by CO2 dissolving in rain.

C. Correct: carbon dioxide dissolves in rainwater to form carbonic acid (H2CO3).

D. Wrong: chlorofluorocarbons are industrial chemicals, not formed by CO2 in rain. (The printed key records A; it is wrong. The stem prints "Natural rains forms"; filed as "Natural rain forms". This question is also in the independent student recall of this paper, "What is formed when CO2 reacts with water? ... natural rain and CO2".)

174 Chemistry

The major source of unburnt hydrocarbons in the atmosphere is / are

- A. Petroleum
- B. Natural gas
- C. Automobiles ✓ **Correct answer**
- D. Human beings

A. Wrong as the paper's answer: petroleum is a fuel, but the paper's intended answer is automobiles (see C).

B. Wrong: natural gas is a fuel, but it is not the major source of unburnt hydrocarbons.

C. Correct: vehicle exhaust is the major source of unburnt hydrocarbons in the atmosphere.

D. Wrong: human beings are not a major source of unburnt hydrocarbons. (The printed key records A; it is wrong. Option C prints "Atumobiles", a misprint of "Automobiles"; corrected as documented in the reviewed file.)

Note: Filed option C read "Atumobiles" (misprint in the source reproduction); corrected to "Automobiles" as documented in the reviewed file.

Question 175 Biology

Among the most abundant biomolecules, -------- is the most abundant one on earth.

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

A. Correct: proteins are the most abundant biomolecules on earth.

B. Wrong: carbohydrates are abundant, but proteins are the most abundant biomolecules.

…ids are less abundant than proteins.

D. Wrong: vitamins are needed only in tiny amounts. (The stem prints "the most abundant one of earth"; filed as "the most abundant one on earth".)

Question 176 Biology

Genetic mutations occur in

- A. RNA
- B. Protein
- C. DNA ✓ **Correct answer**
- D. All of the above

A. Wrong as the paper's answer: genetic mutations occur in DNA, not in RNA (the printed key records A; it is wrong).

B. Wrong: a mutation in DNA may change a protein, but the mutation itself occurs in DNA, not in protein.

C. Correct: genetic mutations occur in DNA.

D. Wrong: the mutation occurs in DNA, not in all three. (The printed key records A; it is wrong. This is the same question as Q77 above, with the options shuffled; both are answered DNA.)

Question 177 Biology

Enzymes that are functioning within the cell are called:

- A. Endoenzymes ✓ **Correct answer**
- B. Exoenzymes
- C. Holoenzymes
- D. Both A and B

A. Correct: enzymes that function within the cell are endoenzymes.

toenzymes function outside the cell.

C. Wrong: a holoenzyme is a complete enzyme with its cofactor, not an enzyme defined by where it works.

D. Wrong: only A is correct. (The printed key records C; it is wrong. The stem prints "Enzyems"; filed as "Enzymes". Option D prints "Both A and"; corrected to "Both A and B" as documented in the reviewed file.)

Note: Filed option D read "Both A and" (misprint in the source reproduction); corrected to "Both A and B" as documented in the reviewed file.

Question 178 Chemistry

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

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

A. Wrong: ammonia is a gas, not a solid fertiliser, and its nitrogen content is lower than urea's.

B. Correct: urea is about 46% nitrogen, the highest of the solid fertilisers listed.

C. Wrong: diammonium hydrogen phosphate is about 21% nitrogen.

D. Wrong: ammonium nitrate is about 35% nitrogen. (The printed key records A; it is wrong. Option C prints "DI ammonium hydrogen phosphate"; corrected to "Diammonium hydrogen phosphate" as documented in the reviewed file.)

Note: Filed option C read "DI ammonium hydrogen phosphate" (misprint in the source reproduction); corrected to "Diammonium hydrogen phosphate" as documented in the reviewed file.

179 Chemistry

To avoid the formation of toxic compounds with chlorine, which substance is used for disinfecting water?

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

A. Correct: chloramines disinfect water without forming the toxic chlorinated compounds that free chlorine forms.

B. Wrong as the paper's answer: ozone is also a disinfectant, but the paper's intended answer is chloramines.

C. Wrong: alums are coagulants used to clarify water, not disinfectants. (Only three options are printed; there is no option D. The stem carries a stray "a." (a lost sub-option marker); it was stripped and the stem filed clean. Option B prints "O 3"; corrected to "O3" as documented in the reviewed file.)

Note: Filed option B read "O 3" (misprint in the source reproduction); corrected to "O3" as documented in the reviewed file.

Question 180 English

The antonym of 'ZENITH' is

- A. Peak
- B. Summit
- C. Nadir ✓ **Correct answer**
- D. Apex

A. Wrong: a peak is a synonym of zenith (the highest point), not its antonym.

B. Wrong: a summit is a synonym of zenith.

…e nadir (the lowest point) is the antonym of the zenith (the highest point).

D. Wrong: an apex is a synonym of zenith. (Option D carries trailing advertisement text in the reproduction — "ORDER FORM | NUMS Entry Test Book | Free Delivery | Cash on Delivery" — which was stripped.)

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