KMU MDCAT 2025, Paper D — Solved Past Paper

Body: Khyber Medical University (KMU), Khyber Pakhtunkhwa · **Post:** MDCAT (Medical & Dental College Admission Test), Paper D · **Year:** 2025 · **Questions:** 180 in the original paper — **176 solved and verified**, 4 excluded as defective (Q14, Q177, Q179, Q180) · **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. Answers are as of the 2025 sitting.

Source note: Primary source: mdcatpapers.com transcription of KMU MDCAT 2025 Paper D (accessed 31 Oct 2026), 147 questions, transcribed word for word. Second source: the faithful Code D reproduction above + the taleem360 key sheet. 29 questions were recovered from the reproduction and added as printed-number appendices (Q148–Q155: printed 87, 92, 111, 126–128 as corrected; Q156–Q176: printed 49, 88, 117, 120–123, 147–152, 154–155, 157–162), and Q177–Q180 (printed 89, 98, 153, 156) were transcribed 8 Nov 2026 from the reproduction's rendered pages. Every answer was checked by worked derivation or reference fact, independently of the transcription's marked answer. 4 questions are DEFECTIVE-excluded by the assistant's decision under the owner's 8 Nov 2026 delegation (37be precedent): Q14, Q177 [printed 89], Q179 [printed 153], Q180 [printed 156] — see the excluded list. Numbering follows the file: transcription order Q1–Q147, then printed-number appendices in printed-number order; do NOT renumber.

Question Q1 Biology

Intrinsic factor secreted by parietal cells is essential for:

- A. Activation of pepsinogen to pepsin

orption of vitamin B12 in the intestine ✓ **Correct answer**

- C. Emulsification of dietary fats
- D. Neutralization of stomach acid in the duodenum

A. Pepsinogen is turned into pepsin by acid and by pepsin itself in the stomach; intrinsic factor plays no part in that activation.

B. Intrinsic factor binds vitamin B12 and the complex is absorbed in the ileum; without it B12 cannot be taken up, causing deficiency; correct.

C. Fat emulsification is the work of bile salts, not intrinsic factor.

D. Acid entering the duodenum is neutralised mainly by pancreatic bicarbonate, not by intrinsic factor.

Question Q2 Biology

The δ (delta) cells in the islets of Langerhans secrete:

- A. Insulin
- B. Somatostatin ✓ **Correct answer**
- C. Glucagon
- D. Pancreatic polypeptide

A. Insulin comes from the β (beta) cells of the islets, not the δ cells.

B. The δ cells release somatostatin, which damps down both insulin and glucagon release; correct.

C. Glucagon comes from the α (alpha) cells, the opposite arm of islet control.

D. That hormone comes from the PP (F) cells, a fourth islet cell type, not from δ cells.

Question Q3 Biology

Identify the main function of duodenum:

storage

- B. Absorption of water
- C. Digestion of food ✓ **Correct answer**
- D. Waste storage

A. Bile is stored in the gallbladder; the duodenum only receives bile through the bile duct.

B. Most water absorption happens in the large intestine, not in the duodenum.

C. The duodenum is where chyme meets pancreatic enzymes and bile, so chemical digestion is at its height there; correct.

D. Faecal waste is held in the rectum, not in the duodenum.

Question Q4 Biology

Which stage of the swallowing process prevents food or liquid from being aspirated to the lungs?

- A. Oral
- B. Pharyngeal ✓ **Correct answer**
- C. Oesophageal
- D. Peristalsis

A. The oral stage only shapes the bolus and pushes it back; the airway is still open at that point.

B. In the pharyngeal stage the larynx rises and the epiglottis closes the airway, so food cannot enter the trachea; correct.

C. The oesophageal stage carries the bolus down to the stomach, after the airway has already been protected.

D. Peristalsis is the wave of muscle contraction that moves food along; it is the mechanism, not the airway-guarding stage.

Q5 Biology

Which type of nephron is responsible for the development of osmotic gradients in the renal medulla?

- A. Glomerular
- B. Cortical
- C. Juxtamedullary ✓ **Correct answer**
- D. Medullary

A. "Glomerular" describes the filtering knot of capillaries, not a class of nephron that builds a gradient.

B. Cortical nephrons have short loops of Henle that barely enter the medulla, so they cannot set up the deep gradient.

C. These nephrons sit at the cortex–medulla border with long loops reaching deep into the medulla, and their countercurrent working builds the osmotic gradient used to concentrate urine; correct.

D. There is no standard "medullary nephron" class; the gradient-building nephrons are the juxtamedullary ones.

Question Q6 Biology

Which of the following describes how the distal convoluted tubule contributes to regulation of blood pH in the body?

- A. Selective reabsorption of Glucose
- B. Active secretion of hydrogen ions into the filtrate ✓ **Correct answer**
- C. Active secretion of sodium from the glomerular filtrate
- D. Tubular reabsorption of potassium ions

A. Glucose is reclaimed in the proximal tubule, and it has nothing to do with pH control.

B. The distal tubule and collecting duct secrete H^+ (while reclaiming bicarbonate), directly

blood acidity, correct.

C. Sodium handling in the distal tubule is about salt and water balance; the wording also gets the direction wrong, since sodium is reabsorbed, not secreted, there.

D. Potassium is mainly secreted, not reabsorbed, in the distal nephron, and potassium handling is not the pH mechanism asked for.

Question Q7 Biology

The sodium potassium pumps in the distal convoluted tubule are activated by:

- A. Aldosterone ✓ **Correct answer**
- B. Antidiuretic hormone
- C. Anti-natriuretic peptide
- D. Renin

A. Aldosterone raises the number and activity of Na^+/K^+ pumps and sodium channels in distal nephron cells, driving sodium reabsorption and potassium secretion; correct.

B. ADH (vasopressin) controls water permeability via aquaporins; it does not switch on these pumps.

C. No such hormone activates the pumps; natriuretic peptides oppose aldosterone's salt-retaining effect.

D. Renin is the enzyme that starts the renin–angiotensin cascade leading to aldosterone release; it does not itself act on the pumps.

Question Q8 Biology

If a person drinks excessive amount of water, how does the kidney respond to maintaining osmoregulation?

- A. Increase ADH release and water reabsorption
- B. Increase aldosterone release and reabsorb more sodium

rease renin secretion and retain more water

- D. Decrease ADH release and increase water excretion ✓ **Correct answer**

A. That is the response to dehydration, the exact opposite of what excess water requires.

B. Aldosterone defends sodium and blood volume, not the dilution caused by excess water.

C. Less renin would reduce salt retention, and retaining water would worsen the dilution, not correct it.

D. Dilute blood suppresses ADH, the collecting ducts become less permeable to water, and the extra water leaves as large volumes of dilute urine; correct.

Question Q9 Biology

The primary function of glomerular capillaries is:

- A. Reabsorption of water and solutes from the renal tubules
- B. Secretion of waste products from the blood into the tubules
- C. Filtration of blood from glomerular filtrate ✓ **Correct answer**
- D. Supply of nutrients and oxygen to the kidney

A. Reabsorption is done by the peritubular capillaries and tubule cells, not by the glomerular tuft.

B. Tubular secretion happens further along the nephron; the glomerulus filters, it does not secrete.

C. The intended answer: the glomerular capillaries filter plasma to form the glomerular filtrate in Bowman's capsule; correct in intent, though the option prints the wording backwards (filtration is OF blood TO FORM filtrate, not "from" filtrate) — defect noted, not silently corrected.

D. Renal blood flow does nourish the kidney, but that is a general blood-supply role, not

lar capillaries' specialised primary function.

Question Q10 Biology

In a heat stroke the hypothalamus will detect an increase in core body temperature, which of the following response is triggered

- A. Vasoconstriction and shivering
- B. Vasodilation and sweating ✓ **Correct answer**
- C. Increased metabolic rate
- D. Release of thyroxin

A. Those are heat-conserving, heat-producing cold responses; they would make overheating worse.

B. Widening skin vessels brings heat to the surface and sweating loses it by evaporation: the hypothalamus's heat-loss response; correct.

C. Raising metabolism generates more internal heat, the opposite of what a hot body needs.

D. Thyroid hormone sets long-term metabolic rate; it is not the acute heat-stroke response.

Question Q11 Biology

Which nitrogenous waste has the lowest solubility in water?

- A. Urea
- B. Ammonia
- C. Uric acid ✓ **Correct answer**
- D. Nitrite

A. Urea dissolves readily in water, which is why it can be flushed out in urine.

B. Ammonia is very soluble in water (it forms ammonium hydroxide), the most soluble of

ssic wastes.

C. Uric acid is barely soluble; it precipitates as crystals, seen in gout and uric-acid stones; correct.

D. Nitrite salts dissolve in water and nitrite is not one of the standard nitrogenous wastes compared here.

Question Q12 Biology

By nature, human excretory system is:

- A. Ammonotelic
- B. Uricotelic
- C. Ureotelic ✓ **Correct answer**
- D. Aminotelic

A. Ammonia-excreting animals (most aquatic animals) dump toxic ammonia straight into water; humans do not.

B. Uric-acid excreters (birds, reptiles) save water by excreting paste; humans excrete only small amounts of uric acid.

C. Humans convert ammonia to the far less toxic urea in the liver and excrete it in urine; correct.

D. Excreting amino acids directly is not the human pattern; amino groups are stripped off and dealt with as urea.

Question Q13 Biology

Hyperparathyroidism may lead to the formation of:

- A. Calcium phosphate stones ✓ **Correct answer**
- B. Uric acid stones
- C. Cystine stones

A. Excess parathyroid hormone raises blood calcium, so calcium salts (including calcium phosphate) precipitate in the kidney; correct among the options.

B. These follow high uric-acid levels (gout, purine excess), not parathyroid overactivity.

C. These come from the inherited transport defect cystinuria, unrelated to parathyroid hormone.

D. Struvite stones follow urinary infection by urea-splitting bacteria, not hyperparathyroidism.

Question Q14 — Excluded (defective)

In somatic cell hybridization, which two cells are fused to produce monoclonal antibodies?

- A. T-cells and nerve cells
- B. B-lymphocytes and spleen cells
- C. T-cells and liver cells
- D. B-lymphocytes and macrophages

No answer is given for this question, and none is taught. The correct fusion partner (a myeloma cell) is not among the options; 'spleen cells' names the B-lymphocyte source tissue, not the fusion partner. The official key (Code D 14 = B, two agreeing copies) records only the intended letter. Decided by assistant under the owner's 8 Nov 2026 delegation. This question must never be taught as having a single answer.

A. Neither cell type makes antibodies, and nerve cells are never fusion partners for antibody production.

B. The marked key: antibody-making B-lymphocytes are taken from the spleen, so this option gestures at the lymphocyte source.

not secrete antibodies and liver cells play no part in hybridoma fusion.

D. Macrophages engulf pathogens; they are not the immortal fusion partner. DEFECTIVE-excluded — decided by assistant under the owner's 8 Nov 2026 delegation. A hybridoma is made by fusing an antibody-producing B cell (usually from the spleen) with a myeloma (cancerous plasma) cell that confers immortality; "spleen cells" names the source tissue of the B cells, not the second fusion partner. No option states the myeloma fusion partner, so no option can be correct as printed. The official key (Code D 14 = B, two agreeing copies: the reproduction's own key table and the taleem360 CamScanner key sheet) records the intended letter only; it does not cure the missing option. This question must never be taught as having a single answer.

Question Q15 Biology

In molecular diagnostics, the primary function of DNA/RNA probes is to:

- A. Replace malfunctioning genes in effected cells
- B. Bind to specific DNA or RNA sequences for identification ✓ **Correct answer**
- C. Cut genetic material at precise locations
- D. Stimulate immune responses against disease-causing organisms

A. Replacing genes is gene therapy, delivered by vectors; probes only detect, they do not repair (the option also prints "effected" for affected).

B. A probe is a labelled single strand that hybridises to its complementary target, revealing whether a particular sequence is present; correct.

C. Cutting is done by restriction enzymes or CRISPR nucleases, not by probes.

D. That is the job of vaccines and antigens; probes act in the test tube, not in the immune system.

Question Q16 Biology

A set of uniform proteins generated by genetically identical immune cells (a clone) is

- A. Therapeutic proteins
- B. Immunoglobulins
- C. Monoclonal antibodies ✓ **Correct answer**
- D. Recombinant proteins

A. A broad use-category (insulin, growth hormone, clotting factors); it does not mean "one clone, one antibody".

B. The general class name for all antibodies; a serum full of different immunoglobulins is polyclonal, not monoclonal.

C. Identical antibody molecules from a single clone of cells, all binding one epitope; correct.

D. Proteins made by engineered DNA in a host cell; many are not antibodies at all, and the term says nothing about clonal uniformity.

Question Q17 Biology

Which biotechnological product is used to replace an abnormal gene in a patient's cells?

- A. Antibiotic
- B. Vaccine
- C. Vector ✓ **Correct answer**
- D. Interferon

A. Antibiotics kill bacteria; they cannot carry a gene into a human cell.

B. Vaccines train the immune system against a pathogen; they do not replace genes.

C. A vector (often a disabled virus, or a plasmid) carries the healthy gene copy into the patient's cells in gene therapy; correct.

D. Interferons are signalling proteins that fight viruses; they deliver no genetic cargo.

Q18 Biology

In Watson and Crick's DNA model, which of the following pairs with Cytosine?

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

A. Adenine pairs with thymine in DNA (two hydrogen bonds), not with cytosine.

B. Cytosine pairs with guanine by three hydrogen bonds across the double helix; correct.

C. Thymine is adenine's partner in DNA, not cytosine's.

D. Uracil replaces thymine in RNA and pairs with adenine there; it is not a DNA base and not cytosine's partner.

Question Q19 Biology

Fats are considered as a very efficient source of energy because they:

- A. Produce ATP directly and without requiring respiration
- B. Enter into glycolysis without any modification
- C. Are highly oxidized compounds
- D. Generate multiple acetyl groups that produce more ATP ✓ **Correct answer**

A. No fuel makes ATP without respiration; fats must be broken down through β-oxidation and the Krebs cycle first.

B. Glycolysis handles sugars; fats are split into glycerol and fatty acids, and the fatty acids enter as acetyl-CoA, not through glycolysis.

C. Backwards: fats are highly REDUCED (rich in C–H bonds), which is exactly why oxidising them releases so much energy.

D. Each long fatty-acid chain is chopped into many acetyl-CoA units, each feeding the

so a gram of fat yields far more ATP than a gram of carbohydrate; correct.

Question Q20 Biology

The junction between two consecutive neurons where information is transmitted from one neuron to the next is called:

- A. Node-of Ranvier
- B. Synapse ✓ **Correct answer**
- C. Axon terminal
- D. Dendrite cleft

A. A gap in the myelin sheath along one axon where the impulse is regenerated; it is not the junction between two neurons.

B. The specialised junction (presynaptic terminal, cleft, postsynaptic membrane) where one neuron passes the signal to the next; correct.

C. The axon terminal is only the sending end of the synapse, one part of the junction, not the junction itself.

D. Not a standard term; the gap in a synapse is the synaptic cleft, and "dendrite cleft" names no structure.

Question Q21 Biology

All of the following are the functions of Golgi bodies EXCEPT:

- A. Processing of protein
- B. Plasma membrane formation
- C. Cellular respiration ✓ **Correct answer**
- D. Lysosome formation

A. The Golgi modifies, sorts and packages proteins arriving from the endoplasmic reticulum; a genuine Golgi function.

cles fuse with the cell surface, supplying new membrane; a genuine Golgi contribution.

C. Respiration (ATP production) happens in mitochondria, not in the Golgi; this is the exception; correct.

D. Lysosomes bud from the Golgi, carrying digestive enzymes; a genuine Golgi function.

Question Q22 Biology

Which ion is tenfold higher in concentration outside the membrane of neuron during resting potential?

- A. Potassium
- B. Sodium ✓ **Correct answer**
- C. Calcium
- D. Hydrogen

A. Potassium is far higher INSIDE the resting neuron (≈ 140 mM in, ≈ 4 mM out), the reverse of what is asked.

B. Sodium is roughly tenfold higher outside (≈ 145 mM out vs ≈ 12 mM in), held there by the Na^+/K^+ pump; correct.

C. Calcium is higher outside too, but by far more than tenfold (millimolar outside vs ~100 nM free inside), and it is not the ion the "tenfold" textbook figure describes.

D. Hydrogen-ion (pH) differences across the neuronal membrane are small and are not described by the tenfold figure.

Question Q23 Biology

All of the following are the modes of transmission of AIDS, EXCEPT:

- A. Transfusion of infected blood
- B. Sharing infected needles

king hands with infected person ✓ **Correct answer**

- D. Sexual contact with infected person

A. Blood transfusion is a real HIV transmission route; it belongs on the list.

B. Sharing needles passes infected blood directly and is a real route.

C. Casual skin contact does not transmit HIV; this is the exception; correct.

D. Sexual contact is a principal HIV transmission route.

Question Q24 Biology

Which organelle of the cell is involved in the detoxification of toxins and poisonous compounds?

- A. Lysosomes
- B. Smooth Endoplasmic Reticulum ✓ **Correct answer**
- C. Ribosomes
- D. Mitochondria

A. Lysosomes digest worn-out cell parts and engulfed material; they are not the detoxification workshop.

B. The smooth ER carries cytochrome P450 and other detoxifying enzymes that break down drugs and poisons, especially in liver cells; correct.

C. Ribosomes build proteins; they detoxify nothing.

D. Mitochondria make ATP by respiration; detoxification is not their role.

Question Q25 Biology

The active site is important in enzyme action because:

- A. It binds to the substrate ✓ **Correct answer**
- B. It maintains the pH of reaction

- ~~C. It provides energy for reaction~~
- D. It changes the shape of the enzyme

A. The active site is the pocket that fits the substrate and holds it for catalysis; that binding is the whole point of the site; correct.

B. pH is a property of the surroundings, set by buffers and the medium, not maintained by the active site.

C. Enzymes do not supply energy; they lower the activation energy so the reaction's own energy can proceed.

D. Binding can induce a shape change (induced fit), but the change is a consequence of binding, not the reason the site matters.

Question Q26 Biology

The idea that acquired characters are inherited is part of:

- A. Darwinism
- B. Neo Darwinism
- C. Lamarckism ✓ **Correct answer**
- D. Biogenesis

A. Darwin's theory rests on heritable variation and natural selection, not on the inheritance of characters acquired in a lifetime.

B. The modern synthesis combines Darwin with genetics and mutation; acquired characters play no part.

C. Lamarck's core claim was use and disuse plus the inheritance of acquired characters; correct.

D. Biogenesis is the principle that life comes only from life; it says nothing about inheritance of acquired traits.

Q27 Biology

Which disease is caused by enveloped virus?

- A. Leaf curl disease of cotton
- B. Flu ✓ **Correct answer**
- C. Polio
- D. Hepatitis A

A. Cotton leaf curl is a plant disease caused by a geminivirus, which is non-enveloped.

B. Influenza virus carries a lipid envelope studded with haemagglutinin and neuraminidase; correct.

C. Poliovirus is a naked (non-enveloped) picornavirus.

D. Hepatitis A virus is also non-enveloped, which is why it survives well outside the body.

Question Q28 Biology

The glycoproteins are commonly found in:

- A. Mitochondria
- B. Chloroplasts
- C. Ribosomes
- D. Plasma membrane ✓ **Correct answer**

A. Mitochondrial membranes contain proteins, but glycoproteins are not their characteristic, commonly cited location.

B. Chloroplast membranes are built for photosynthesis; surface glycoproteins are not their hallmark.

C. Ribosomes are RNA plus protein with no membrane and no glycosylation role.

D. Glycoproteins sit in the cell-surface membrane as recognition and signalling molecules (the glycocalyx); correct.

Q29 Biology

Which structure enables the exchange of material between nucleus and cytoplasm?

- A. Plasma membrane
- B. Nuclear pores ✓ **Correct answer**
- C. Lysosomes
- D. Mitochondria

A. The plasma membrane bounds the whole cell and controls exchange with the outside, not between nucleus and cytoplasm.

B. Pores through the nuclear envelope let RNA out and proteins in under regulated transport; correct.

C. Lysosomes digest material inside the cytoplasm; they connect nothing to the nucleus.

D. Mitochondria exchange metabolites with the cytoplasm, but not across the nuclear envelope.

Question Q30 Biology

The high specific heat capacity of water is due to:

- A. Ionic bonding
- B. Hydrogen bonding ✓ **Correct answer**
- C. Covalent bonding
- D. Hydrophilic bonding

A. Liquid water contains no ionic lattice; ions appear only when substances dissolve in it.

B. The network of hydrogen bonds between water molecules must be loosened before temperature can rise, so water absorbs much heat for little temperature change; correct.

C. The O–H covalent bonds inside each molecule stay intact when water is warmed; bulk heat capacity is about bonds BETWEEN molecules.

ilic bonding" is not a recognised bond type; hydrophilic describes water-attracting behaviour, not a bond.

Question Q31 Biology

The contracted region of a chromosome that attaches to spindle fiber is called:

- A. Telomere
- B. Chromatin
- C. Centromere ✓ **Correct answer**
- D. Nucleosomes

A. Telomeres cap the ends of chromosomes and protect them; spindle fibres do not attach there.

B. Chromatin is the general DNA–protein material of the chromosome, not the attachment point.

C. The constricted region where the kinetochore forms and spindle microtubules attach to pull chromatids apart; correct.

D. Nucleosomes are DNA wound around histones, the packing units of chromatin, not the spindle-attachment region.

Question Q32 Biology

Touching a sharp object stimulates pain receptors. This information is carried to the central nervous system by the:

- A. Motor-neuron
- B. Sensory neuron ✓ **Correct answer**
- C. Associative neuron
- D. Effector neuron

A. Motor neurons carry commands OUT from the central nervous system to muscles and

opposite direction.

B. Sensory (afferent) neurons carry receptor signals in to the central nervous system; correct.

C. Interneurons (associative neurons) relay signals within the central nervous system; they do not bring the signal in from the receptor.

D. "Effector neuron" is not the afferent pathway; effectors are the muscles/glands that respond, driven by motor neurons.

Question Q33 Biology

The number of chromosomes in a haploid cell are:

- A. Half the chromosomes in a normal body cell ✓ **Correct answer**
- B. Double the chromosomes in a normal body cell
- C. Quarter the chromosomes in a normal body cell
- D. Equal to the chromosomes in a normal body cell

A. A gamete carries one set (n) against the body cell's two sets (2n), i.e. half; correct.

B. Doubling would give a tetraploid cell, not a gamete.

C. Meiosis halves the number once, not twice; a quarter set cannot restore the diploid number at fertilisation.

D. Equal would mean the gamete is diploid, and fertilisation would then double the number every generation.

Question Q34 Biology

Which of the following is a branched polysaccharide found in animals:

- A. Cellulose
- B. Glycogen ✓ **Correct answer**

- D. Chitin

A. Cellulose is the straight-chain structural polysaccharide of plant cell walls, not an animal store.

B. The highly branched glucose polymer stored in animal liver and muscle, with many branch ends for rapid release; correct.

C. Amylose is the largely unbranched, helical component of plant starch.

D. Chitin is the structural polysaccharide of arthropod exoskeletons and fungal walls, built in straight chains, not the animal storage polymer.

Question Q35 Biology

A substance that binds to an enzyme, but NOT at the active site and reduces the enzyme activity is called:

- A. Competitive inhibitor
- B. Substrate
- C. Non-Competitive inhibitor ✓ **Correct answer**
- D. Cofactor

A. A competitive inhibitor competes for the ACTIVE site itself, so it fails the "not at the active site" condition.

B. The substrate is the normal molecule the enzyme acts on; it binds at the active site and is turned into product, not an inhibitor.

C. It binds at an allosteric site away from the active site and distorts the enzyme so activity falls, whatever the substrate level; correct.

D. A cofactor (metal ion or coenzyme) helps the enzyme work; it does not inhibit it.

Q36 Biology

On the basis of morphological classification, influenza virus is an example of:

- A. Helical capsid virus
- B. Polyhedral capsid virus
- C. Enveloped capsid virus ✓ **Correct answer**
- D. Non-enveloped capsid virus

A. Influenza's ribonucleoprotein is helical inside, but the classification the options test is the outer envelope, not the inner helix.

B. Polyhedral (icosahedral) capsids belong to viruses like adenovirus; influenza is not described this way.

C. Influenza carries its capsid inside a lipid envelope taken from the host cell; among the options the envelope is the defining feature; correct.

D. Influenza is enveloped, so this is the direct opposite of the right description.

Question Q37 Biology

Which of the following is NOT a globular protein?

- A. Enzyme
- B. Albumin
- C. Hemoglobin
- D. Collagen ✓ **Correct answer**

A. Most enzymes are compact, soluble, roughly spherical proteins: globular.

B. Albumin is a soluble globular transport protein of the blood plasma.

C. Haemoglobin is a soluble globular protein that carries oxygen in red cells.

D. Collagen is a long, rope-like FIBROUS structural protein of skin, tendon and bone; it is the non-globular one; correct.

Q38 Biology

The state, when a neuron is NOT conducting an impulse during resting membrane potential is called;

- A. Polarized ✓ **Correct answer**
- B. Depolarized
- C. Repolarized
- D. Hyperpolarized

A. At rest the membrane holds its charge separation (inside negative, outside positive); that resting state is the polarised state; correct.

B. Depolarisation is the loss of that charge difference during the rising phase of an action potential.

C. Repolarisation is the recovery back toward rest AFTER an impulse, not the resting state itself.

D. Hyperpolarisation means more negative than the resting potential, an after-effect of an impulse, not the resting state.

Question Q39 Biology

Which of the following waves travel along a neuron during nerve impulse conduction?

- A. Thermal waves
- B. Mechanical waves
- C. Electromagnetic waves
- D. Electrochemical waves ✓ **Correct answer**

A. Heat does not carry the nerve signal; temperature changes are side effects, not the impulse.

B. The impulse is not a pressure or sound wave travelling through tissue.

r radio wave propagates along the axon; the signal is ionic, not electromagnetic radiation.

D. The action potential is a moving wave of membrane depolarisation driven by Na^+/K^+ movement: electrical and chemical together; correct.

Question Q40 Biology

The reticular formation in the brain runs through which structures?

- A. Forebrain and Midbrain
- B. Hindbrain and Midbrain ✓ **Correct answer**
- C. Cerebellum and Forebrain
- D. Telencephalon and Cerebellum

A. The reticular formation does not extend up into the forebrain as a whole; its core is in the brainstem.

B. The reticular formation is a network running through the brainstem — medulla and pons (hindbrain) and midbrain — controlling arousal and sleep–wake cycles; correct.

C. The cerebellum sits behind the brainstem and is not the course of the reticular formation.

D. The telencephalon (cerebral hemispheres) is forebrain, outside the brainstem course of the formation.

Question Q41 Biology

Enzymes increase the rate of reaction by:

- A. Increasing activation energy
- B. Lowering activation energy ✓ **Correct answer**
- C. Increasing pH
- D. Decreasing pH

energy barrier would slow the reaction down, the opposite of catalysis.

B. Enzymes stabilise the transition state, so more molecules can cross the barrier at a given temperature and the rate rises; correct.

C. pH changes can alter enzyme activity, but raising pH is not the general mechanism of catalysis.

D. Likewise, lowering pH is not how enzymes speed reactions; extreme pH denatures most enzymes.

Question Q42 Biology

A diabetic patient is advised to avoid both sucrose and lactose, because they both:

- A. Are structural carbohydrates
- B. Increase blood glucose after hydrolysis ✓ **Correct answer**
- C. Cannot be digested in human
- D. Act as non-caloric sweeteners

A. Structural carbohydrates are cellulose and chitin; sucrose and lactose are soluble sugars, not structural materials.

B. Both are disaccharides split into monosaccharides (sucrose → glucose + fructose; lactose → glucose + galactose) that raise blood glucose; correct.

C. Both are digested by humans (sucrase for sucrose, lactase for lactose); indigestibility is not the issue.

D. They are ordinary caloric sugars, the opposite of non-caloric sweeteners.

Question Q43 Biology

Match the CORRECT structure of the brain with its function:

- A. Medulla: Breathing ✓ **Correct answer**

s: Memory

- C. Cerebellum: Dreaming
- D. Midbrain: Balance

A. The medulla oblongata houses the respiratory centres that set breathing rhythm; correct.

B. The pons relays signals between cerebrum and cerebellum and helps regulate sleep; memory is centred in the hippocampus and cortex, not the pons.

C. The cerebellum coordinates movement and balance; dreaming is a cortical/sleep phenomenon, not cerebellar.

D. The midbrain handles visual/auditory reflexes and motor pathways; balance is chiefly cerebellar and vestibular, not midbrain.

Question Q44 Biology

Living cells Do NOT directly acquire energy released from the breakdown of food molecules because:

- A. Glucose cannot be broken down inside the cells
- B. Energy released is too small to be used by the cells
- C. Glucose molecules do not store any energy
- D. The energy released is too large, leading to heating and wastage ✓ **Correct answer**

A. Glucose IS broken down inside cells (glycolysis in the cytoplasm, then the mitochondria); the premise is false.

B. The energy in food is large, not too small; the problem is capturing it in usable form.

C. Glucose stores substantial chemical energy in its bonds; that is why it is food.

D. On the textbook framing, releasing all the energy in one uncontrolled step would

s heat, so cells capture it in small steps through ATP; correct on that convention. NOTE: the answer rests on the FSc textbook's "too large / heat wastage" wording rather than on a derivation; the underlying fact is stepwise ATP capture. Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (44 = D, two agreeing copies) agrees.

Note: Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov 2026 delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (44 = D, two agreeing copies) agrees. The answer rests on the FSc textbook's 'too large / heat wastage' wording; the underlying fact is stepwise ATP capture.

Question Q45 Biology

Which properties of water enable it to circulate in living bodies and act as transport medium?

- A. Ionization and low density
- B. Cohesion and ionization
- C. Ionization and adhesion
- D. Adhesion and cohesion ✓ **Correct answer**

A. Ionisation (splitting into H^+ and OH^-) and density have no direct role in water's movement as a transport fluid.

B. Cohesion matters, but ionisation does not drive circulation or transport.

C. Adhesion matters, but ionisation is again irrelevant to the transport role.

D. Cohesion (water sticking to water) keeps a continuous column, and adhesion (water sticking to vessel walls) lets it climb and spread by capillarity; together they underpin transport in xylem and in body fluids; correct.

Q46 Biology

A scientist cuts the tails of mice for several generations, but their offspring are always born with tails. This rejects:

- A. Darwinism
- B. Neo Darwinism
- C. Lamarckism ✓ **Correct answer**
- D. Mutation theory

A. Darwinism predicts exactly this result: a mutilation is not a heritable variation, so selection has nothing to act on.

B. The modern synthesis likewise holds that only genetic change is inherited, so it is confirmed, not rejected, by the experiment.

C. Lamarckism requires acquired characters (a cut tail) to pass to offspring; generations of tailed offspring refute it; correct.

D. Mutation theory concerns sudden heritable genetic changes; tail-cutting tests nothing about mutations.

Question Q47 Biology

How are the phospholipid molecules arranged in the plasma membrane?

- A. Hydrophilic heads face inwards and hydrophobic tails face outwards
- B. Both Hydrophilic heads face each other in the membrane
- C. Hydrophilic heads face outwards and hydrophobic tails face inwards ✓ **Correct answer**
- D. Hydrophilic heads and hydrophobic tails are randomly distributed

A. Reversed: hydrophobic tails cannot face the watery surroundings, and heads cannot hide inside.

B. Heads face the water on both surfaces, not each other; the tails meet in the middle.

r: heads toward the aqueous inside and outside, tails tucked together away from water; correct.

D. The arrangement is strictly ordered by the water-fearing and water-loving ends; randomness would destroy the membrane.

Question Q48 Biology

48. The structure of RNA consists of:

- A. Double polynucleotide strand
- B. Deoxyribose sugar
- C. Five different types of nucleotides
- D. Base uracil instead of thymine ✓ **Correct answer**

A. That describes DNA; RNA is normally a single polynucleotide strand.

B. Deoxyribose is DNA's sugar; RNA uses ribose.

C. RNA uses four bases (A, U, G, C); there is no fifth standard type.

D. RNA uses uracil in place of thymine; correct. DECIDED 8 Nov 2026 by assistant under the owner's 8 Nov delegation: the faithful Code D reproduction prints option D as "Base uracil instead of thymine" and keys D (two agreeing key copies); the transcription's "Base pairing instead of thymine" and examoo's "Base unit instead of thymine" are two different garbles of the same option, and the reproduction's wording is adopted. (Stem carries printed "48."; see numbering note.)

Note: Decided 8 Nov 2026 by assistant under the owner's 8 Nov 2026 delegation: the faithful Code D reproduction prints option D as 'Base uracil instead of thymine' and keys D (two agreeing copies); the transcription's 'Base pairing instead of thymine' and examoo's 'Base unit instead of thymine' are two different garbles of the same option, and the reproduction's wording is adopted.

Q49 Biology

50. Identify the CORRECT option that matches the sugar with its carbon number and functional group:

- A. Glyceraldehyde - Triose, Ketone group
- B. Ribose - Pentose, Aldehyde group ✓ **Correct answer**
- C. Ribulose - Pentose, Aldehyde Group
- D. Galactose - Hexose, Ketone Group

A. Glyceraldehyde is a triose, but it is an ALDEHYDE (aldotriose); the ketone label is wrong.

B. Ribose has five carbons and an aldehyde group (an aldopentose); correct.

C. Ribulose is a pentose, but it is a KETONE (ketopentose); the aldehyde label is wrong.

D. Galactose is a hexose, but it is an ALDEHYDE (aldohexose); the ketone label is wrong. (Stem carries printed "50."; see numbering note.)

Question Q50 Biology

51. The CORRECT sequence of events in a reflex arc is:

- A. Receptor, associative neuron, sensory neuron, motor neuron, effector
- B. Receptor, motor neuron, associative neurone, sensory neuron, effector
- C. Receptor, sensory neuron, associative neuron, motor neuron, effector ✓ **Correct answer**
- D. Receptor, sensory neuron, motor neuron, associative neuron, effector

A. The associative (inter) neuron is placed before the sensory neuron, but the signal must reach the centre before it can be relayed within it.

B. Motor before sensory reverses the whole arc: the response cannot precede the incoming signal.

C. Stimulus → receptor → sensory neuron in → interneuron in the centre → motor neuron

D. The associative neuron is put after the motor neuron, but relaying inside the centre happens before the motor output leaves. (Stem carries printed "51."; see numbering note.)

Question Q51 Biology

52. Fertilisation normally occurs in the:

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

A. The uterus is where the embryo implants and grows, after fertilisation has already happened upstream.

B. The ovary releases the egg; sperm meet it after ovulation, not inside the ovary.

C. The vagina receives sperm during intercourse; fertilisation does not occur there.

D. Sperm and egg normally meet in the fallopian (uterine) tube, usually the ampulla; correct. (Stem carries printed "52."; see numbering note.)

Question Q52 Biology

53. Which cells of the fallopian tube moisten and nourish the ovum?

- A. Ciliated epithelial cells
- B. Non ciliated epithelial cells ✓ **Correct answer**
- C. Germ cells
- D. Endometrial cells

A. Ciliated cells beat to sweep the ovum along the tube; movement, not nourishment, is their main job.

...tory (non-ciliated) cells release fluid that moistens and nourishes the ovum and the early embryo; correct.

C. Germ cells are the eggs and sperm themselves, not the tube's lining cells.

D. Endometrial cells line the uterus, not the fallopian tube. (Stem carries printed "53."; see numbering note.)

Question Q53 Biology

54. Which of the following is NOT the accessory gland of the male reproductive system?

- A. Bulbourethral gland
- B. Seminal vesicle
- C. Prostate gland
- D. Testes ✓ **Correct answer**

A. The bulbourethral (Cowper's) glands are accessory glands that add lubricating mucus to semen.

B. The seminal vesicles are accessory glands contributing most of the seminal fluid.

C. The prostate IS an accessory gland, contributing alkaline fluid to semen.

D. The testes are the primary reproductive organs (gonads) that make sperm and testosterone; they are NOT accessory glands; correct. DECIDED 8 Nov 2026 by assistant under the owner's 8 Nov delegation: the content (Testes) is agreed by the transcription (there at C), the page's own explanation, and the faithful Code D reproduction (there at D, key 54 = D, two agreeing copies); the file adopts the reproduction's option order so the answer letter matches the official key. (Stem carries printed "54."; see numbering note.)

Note: Decided 8 Nov 2026 by assistant under the owner's 8 Nov 2026 delegation: the content (Testes) is agreed by the transcription (there at C), the page's own explanation, and the faithful Code D reproduction (there at D, key 54 = D, two agreeing copies); the file adopts the reproduction's option order so the answer letter matches the official key.

Q54 Biology

55. Syphilis is caused by what kind of bacteria:

- A. Spirochaete ✓ **Correct answer**
- B. Cocci
- C. Bacillus
- D. Vibrio

A. Syphilis is caused by Treponema pallidum, a slender spiral (spirochaete) bacterium; correct.

B. Cocci are spherical bacteria (e.g. staphylococci, streptococci); Treponema is not spherical.

C. Bacilli are rod-shaped bacteria; Treponema is a spiral, not a rod.

D. Vibrios are curved comma-shaped rods (e.g. Vibrio cholerae); Treponema's long spiral form is classified as a spirochaete. (Stem carries printed "55."; see numbering note.)

Question Q55 Biology

56. What is FALSE about cartilages?

- A. Cells are called chondrocytes
- B. Consist of Type II collagen
- C. Heal very slowly
- D. Have an extensive blood supply ✓ **Correct answer**

A. True: cartilage cells embedded in the matrix are chondrocytes.

B. True: type II collagen is the main collagen of hyaline cartilage.

C. True: poor blood supply means slow repair, which is why cartilage injuries linger.

D. False: cartilage is avascular and nourished by diffusion, so this is the false statement the question asks for; correct. (Stem carries printed "56."; see numbering note.)

Q56 Biology

57. Bones provide a rigid framework with an inorganic matrix of:

- A. 35%
- B. 45%
- C. 55%
- D. 65% ✓ **Correct answer**

A. About 35% is the ORGANIC share (collagen and cells), not the inorganic mineral share.

B. Too low for the mineral fraction; bone is mostly mineral by weight.

C. Still below the standard textbook figure for the inorganic (hydroxyapatite) fraction.

D. Roughly two-thirds of bone by weight is inorganic mineral (mainly hydroxyapatite), with about 35% organic matrix; correct. (Stem carries printed "57."; see numbering note.)

Question Q57 Biology

58. An important feature of bone remodeling is bone breakdown. Which cell carries out this function?

- A. Chondrocyte
- B. Osteocyte
- C. Osteoclast ✓ **Correct answer**
- D. Osteoblast

A. Chondrocytes maintain cartilage, not bone; they break down no bone.

B. Osteocytes are mature bone cells sitting in lacunae that sense strain and signal remodelling; they do not resorb bone.

C. Large multinucleated osteoclasts dissolve mineral and digest matrix, resorbing bone; correct.

D. Osteoblasts do the opposite: they lay down new bone matrix. (Stem carries printed

Question Q58 Biology

Myofibrils consist of small contractile units called___

- A. Sarcoplasm
- B. Sarcolemma
- C. Sarcomere ✓ **Correct answer**
- D. Sarcoplasmic reticulum

A. Sarcoplasm is the cytoplasm of the muscle fibre, the fluid around the myofibrils, not their repeating unit.

B. The sarcolemma is the muscle fibre's cell membrane, enclosing the fibre, not a contractile unit.

C. The sarcomere, between two Z-lines, is the repeating contractile unit of the myofibril, built from actin and myosin; correct.

D. The sarcoplasmic reticulum is the calcium store that triggers contraction; it is not itself the contractile unit.

Question Q59 Biology

Which muscle type is under conscious control and is multinucleated?

- A. Smooth muscle
- B. Skeletal muscle ✓ **Correct answer**
- C. Cardiac muscle
- D. Ciliary muscle

A. Smooth muscle is involuntary and its cells have a single central nucleus.

B. Skeletal fibres are voluntary (consciously controlled) and multinucleated from the fusion of myoblasts; correct.

uscle is involuntary and its cells are typically uninucleate (occasionally binucleate).

D. The ciliary muscle of the eye is smooth muscle: involuntary and uninucleate.

Question Q60 Biology

Which part of the sarcomere contain both actin and myosin filament?

- A. I-band
- B. Z-line
- C. A-band ✓ **Correct answer**
- D. H-zone

A. The I-band holds only thin (actin) filaments on either side of the Z-line.

B. The Z-line is the boundary disc anchoring actin; it is not a zone of overlap.

C. The A-band spans the thick (myosin) filaments and the regions where thin filaments overlap them, so it contains both; correct.

D. The H-zone is the central part of the A-band where only myosin is present, with no actin overlap.

Question Q61 Biology

The primary role of calcium ions in muscle contraction is to:

- A. Produce energy
- B. Bind with troponin ✓ **Correct answer**
- C. Carry nerve impulses
- D. Breakdown ATP

A. Energy comes from ATP hydrolysis by myosin; calcium produces no energy.

B. Released Ca^{2+} binds troponin, shifting tropomyosin off actin's binding sites so cross-

form, correct.

C. Nerve impulses are carried mainly by Na^+/K^+ movements; calcium's contraction role is at the troponin step.

D. ATP is broken down by the myosin ATPase at the cross-bridge, not by calcium ions.

Question Q62 Biology

Which of the following is an example of a fibrous joint?

- A. Shoulder joint
- B. Elbow joint
- C. Intervertebral discs
- D. Skull sutures ✓ **Correct answer**

A. The shoulder is a synovial ball-and-socket joint, freely movable.

B. The elbow is a synovial hinge joint, freely movable.

C. Discs between vertebrae are cartilaginous joints, slightly movable, not fibrous.

D. Sutures join skull bones with dense fibrous tissue and allow essentially no movement: classic fibrous joints; correct.

Question Q63 Biology

Which of Mendel's laws can best explain why a child may inherit brown eyes even if one parent has blue eyes?

- A. Law of Dominance ✓ **Correct answer**
- B. Law of Segregation
- C. Law of Independent Assortment
- D. Law of Recombination

A. Brown is dominant over blue, so a child carrying one brown allele shows brown eyes

the other parent shows the recessive blue trait; correct.

B. Segregation says the two alleles separate into gametes; it explains transmission, not why one allele masks the other in appearance.

C. Independent assortment concerns different gene pairs sorting independently; it does not explain dominance within one pair.

D. Recombination is the reshuffling of linked genes by crossing over; it is not one of Mendel's laws and does not explain dominance.

Question Q64 Biology

What is the significance of the 9:3:3:1ratio in a dihybrid cross?

- A. It proves that all genes are linked
- B. It demonstrates that traits assort independently ✓ **Correct answer**
- C. It indicates co-dominance between alleles
- D. It confirms that mutations have occurred

A. Linked genes do NOT give 9:3:3:1; they give mostly parental combinations. The ratio is the signature of unlinked genes.

B. The four phenotypic classes in 9:3:3:1 proportions arise only when the two gene pairs sort independently into gametes; correct.

C. Co-dominance shows both alleles in the heterozygote (e.g. AB blood group); it produces no 9:3:3:1 pattern.

D. The ratio needs no mutation; it follows from normal segregation and assortment of existing alleles.

Question Q65 Biology

In crossing over, an exchange of maternal and paternal chromatid parts occurs while

s chromosomes are paired ____ stage of meiosis.

- A. Metaphase I
- B. Prophase I ✓ **Correct answer**
- C. Anaphase II
- D. Telophase I

A. In metaphase I the paired homologues line up at the equator; crossing over has already happened.

B. Homologues pair (synapsis) in prophase I and exchange segments at chiasmata (pachytene); correct.

C. Anaphase II separates sister chromatids; no pairing or exchange occurs there.

D. Telophase I follows the first separation; the exchange is long finished by then.

Question Q66 Biology

Linked genes DO NOT follow Mendel's Law of Independent Assortment because

- A. They are located on different chromosomes
- B. They always undergo crossing over
- C. They are physically close together on the same chromosome ✓ **Correct answer**
- D. They rarely separate during meiosis

A. Genes on different chromosomes DO assort independently; linkage requires the same chromosome.

B. Crossing over between linked genes is occasional, not always, and it is crossing over that breaks linkage, not what creates it.

C. Being neighbours on one chromosome, they travel together into gametes instead of assorting independently; correct.

D. "Rarely separate" is a consequence of closeness, not the reason linkage exists; and it is

nce crossing over does separate them sometimes.

Question Q67 Biology

A carrier female for an X-linked recessive disorder:

- A. Expresses the disorder fully
- B. Cannot pass the disorder to her sons
- C. Can pass the disorder to her sons ✓ **Correct answer**
- D. Only pases the disorder to her sons

A. A carrier has one normal X that usually masks the recessive allele, so she does not normally express the disorder fully.

B. Wrong: half her sons on average receive her affected X and, having no second X, express the disorder.

C. Each son has a 50% chance of inheriting her affected X; correct.

D. False on two counts: the option prints "pases", and she also passes the allele to daughters (who become carriers); "only ... sons" is wrong.

Question Q68 Biology

Which of the following is an X-linked recessive disorder in humans?

- A. Cystic fibrosis
- B. Thalassemia
- C. Hemophilia ✓ **Correct answer**
- D. Sickle cell anemia

A. Cystic fibrosis is autosomal recessive (chromosome 7), not X-linked.

B. Thalassaemia is autosomal (globin genes on chromosomes 11 and 16), not X-linked.

C. Haemophilia A and B are the classic X-linked recessive disorders, passed through carrier

expressed mainly in males; correct.

D. Sickle-cell anaemia is autosomal recessive (chromosome 11), not X-linked.

Question Q69 Biology

Which of the following CORRECTLY describes the expected outcome of children from a carrier mother for hemophilia (X^h X^h) and a normal father (X^Y)?

- A. All sons will have hemophilia
- B. All daughters will be carriers
- C. 50% of sons will have hemophilia, and 50% of daughters will be carriers ✓ **Correct answer**
- D. All offspring will be unaffected

A. Only the sons who receive the mother's affected X are affected; the others receive her normal X.

B. Only the daughters who receive the mother's affected X become carriers; the others receive her normal X.

C. The carrier mother passes her affected X to half her children: sons receiving it are affected, daughters receiving it are carriers; correct.

D. Half the children inherit the affected allele, so unaffected-all is impossible. (Defect: the stem mis-writes the genotypes — a carrier mother is X^H X^h, not X^h X^h, and a normal father is X^H Y, not X^Y; the outcome in option C is nevertheless the correct one for a carrier × normal cross.)

Question Q70 Biology

The heart is surrounded by a tough, inelastic double membranous covering called:

- A. Pleura
- B. Peritoneum

cardium ✓ **Correct answer**

- D. Meninges

A. The pleura covers the lungs and lines the chest cavity, not the heart.

B. The peritoneum lines the abdominal cavity and covers abdominal organs, not the heart.

C. The double-layered pericardial sac encloses the heart and limits its expansion; correct.

D. The meninges cover the brain and spinal cord, not the heart.

Question Q71 Biology

Which phase of the cardiac cycle is characterized by the opening of semilunar valves?

- A. Atrial systole
- B. Atrial diastole
- C. Ventricular systole ✓ **Correct answer**
- D. Ventricular diastole

A. Atrial contraction pushes blood into the ventricles through the AV valves; the semilunar valves stay shut.

B. Atrial relaxation is not the phase of semilunar opening; the ventricles are doing the work then.

C. When ventricular pressure exceeds arterial pressure, the aortic and pulmonary (semilunar) valves open and blood is ejected; correct.

D. In diastole the ventricles relax, pressure falls, and the semilunar valves close to prevent backflow.

Question Q72 Biology

Which part of the heart's conducting system delays the impulse from atria to the ventricles?

- B. Atrio-ventricular node ✓ **Correct answer**
- C. Purkinje fibers
- D. Atrio-ventricular valves

A. The SA node starts the impulse in the atria; it does not delay it.

B. The AV node holds the impulse briefly (~0.1 s) so the atria finish emptying before the ventricles contract; correct.

C. Purkinje fibres spread the impulse rapidly through the ventricles; speed, not delay, is their role.

D. The AV valves are flaps of tissue preventing backflow; they conduct no impulse at all.

Question Q73 Biology

The heartbeat sound “LUB” is produced on closure of

- A. Aortic valve
- B. Atro-ventricular valves ✓ **Correct answer**
- C. Pulmonary valves
- D. Semilunar valves

A. The aortic valve is a semilunar valve whose closure contributes to the second sound ("DUP"), not "LUB".

B. Closure of the mitral and tricuspid (AV) valves at the start of ventricular systole makes the first sound, "LUB"; correct (the option prints "Atro-ventricular" for atrio-ventricular).

C. The pulmonary valve is the other semilunar valve; its closure belongs to the second sound.

D. Both semilunar valves close to produce "DUP", the second sound, not "LUB".

Q74 Biology

What is the primary function of lymphatic vessels?

- A. Transport oxygenated blood
- B. Drain excess interstitial fluid ✓ **Correct answer**
- C. Produce antibodies
- D. Store metabolic waste

A. That is the arteries' job; lymphatics carry lymph, not oxygenated blood.

B. Lymphatics collect tissue fluid that escapes the capillaries and return it to the bloodstream; correct.

C. Antibodies are produced by plasma (B) cells in lymph nodes and elsewhere; the vessels themselves produce none.

D. Lymphatics store no waste; wastes are excreted by the kidneys and other excretory routes.

Question Q75 Biology

The primary role of helper T cells in immune response is:

- A. Secreting perforins to destroy target cells
- B. Assisting B-cells and other T-cells in their function ✓ **Correct answer**
- C. Inhibiting over activity of the immune system
- D. Engulfing and digesting pathogens

A. Perforin killing is the work of cytotoxic (killer) T cells, not helper T cells.

B. Helper T cells release cytokines that activate B cells and cytotoxic T cells, coordinating the response; correct.

C. Dampening the response is the job of regulatory T cells, not helpers.

D. Phagocytosis is done by macrophages and neutrophils, not by helper T cells.

Q76 Biology

Identify the primary characteristic of 3rd line of defense.

- A. Complement system and interferons
- B. Physical component of skin defense
- C. Specific recognition and memory of pathogens ✓ **Correct answer**
- D. General inflammation and the site of infection

A. Complement proteins and interferons are genuine innate, non-specific humoral defences (first/second line), not the defining characteristic of the third (adaptive) line.

B. The skin (and mucous membranes) form the first-line physical barrier that keeps pathogens out — the first line, not the third.

C. Specific recognition with memory is the hallmark of the third (adaptive) line of defence (antibodies, memory cells); correct.

D. Inflammation is an innate response at an infection site, not the defining characteristic of the third line. DECIDED 8 Nov 2026 by assistant under the owner's 8 Nov delegation: the stem wording differs across the three reproductions — the transcription reads "primary component of innate immune defense" (under which A and B are both defensible), the faithful Code D reproduction reads "primary characteristic of first-line of defense" (read visually from its rendered page; under which B would be the answer), and the examoo reproduction reads "primary characteristic of 3rd line of defense" (under which C is the answer). The official key (Code D 77 = C, two agreeing copies: the reproduction's own key table and the taleem360 CamScanner key sheet) agrees with the 3rd-line wording, so the 3rd-line stem and answer C are adopted; if the true print were the first-line stem, B would be the answer. The three-way conflict is recorded here, not hidden.

Note: Decided 8 Nov 2026 by assistant under the owner's 8 Nov 2026 delegation: the stem wording differs across the three reproductions — the transcription reads 'primary component of innate immune defense' (under which A and B are both defensible), the faithful Code D reproduction reads 'primary characteristic of first-line of defense' (read

its rendered page, under which B would be the answer), and the examoo reproduction reads 'primary characteristic of 3rd line of defense' (under which C is the answer). The official key (Code D 77 = C, two agreeing copies) agrees with the 3rd-line wording, so the 3rd-line stem and answer C are adopted; if the true print were the first-line stem, B would be the answer.

Question Q77 Biology

Which of the following best describes Inspiratory Reserve Volume (IRV)?

- A. The volume of air forcibly exhaled after normal tidal volume
- B. The volume of air remaining in the lungs after forcible expiration
- C. The volume of air exchanged during normal breathing
- D. The volume of air forcibly inhaled after normal tidal volume ✓ **Correct answer**

A. That is the expiratory reserve volume (ERV), the mirror image on exhalation.

B. What remains after a maximal (forcible) expiration is the residual volume, not the IRV. (Option completed 8 Nov 2026 from the Code D reproduction — it was truncated as 'after tidal' in the transcription.)

C. That is the tidal volume itself, the ordinary breath.

D. The extra air that can be drawn in by a maximal inhalation beyond a normal inhalation: IRV; correct.

Question Q78 Biology

During gaseous exchange in human respiration, enzyme carbonic anhydrase is directly involved in the:

- A. Release of oxygen from hemoglobin
- B. Combination of water with carbon dioxide ✓ **Correct answer**
- C. Breakdown of oxyhemoglobin
- D. Binding of oxygen to myoglobin

release is driven by low pO_2 and the Bohr effect; carbonic anhydrase does not pull oxygen off haemoglobin.

B. Carbonic anhydrase catalyses $CO_2 + H_2O \rightleftharpoons H_2CO_3$ (carbonic acid) in red cells, the key step in transporting CO_2; correct.

C. Oxyhaemoglobin gives up oxygen by dissociation, not by this enzyme's action.

D. Myoglobin binds oxygen in muscle by its own affinity; carbonic anhydrase plays no part in it.

Question Q79 Biology

What happens when the external intercostal muscles contract during inhalation in humans?

- A. The rib cage compresses
- B. The ribs move outward ✓ **Correct answer**
- C. The sternum moves inwards
- D. The diaphragm muscles relax

A. Compression of the rib cage happens in forced exhalation (internal intercostals), the opposite movement.

B. External intercostals lift the ribs up and out, enlarging the chest cavity so air flows in; correct.

C. The sternum moves outward and forward during inhalation, not inward.

D. During inhalation the diaphragm CONTRACTS and flattens; relaxation belongs to exhalation.

Question Q80 Biology

The primary effect of smoking on the respiratory system:

creased lung function due to presence of nicotine

- B. Reduced risk of lung cancer due to tolerance
- C. Damage to alveoli reducing gaseous exchange ✓ **Correct answer**
- D. Improves oxygenation of the blood by activating hemoglobin

A. Nicotine does not improve lung function; smoke impairs cilia, inflames airways and destroys alveolar walls.

B. Smoking greatly INCREASES lung-cancer risk; no tolerance protects against it.

C. Smoke breaks down alveolar walls (emphysema), shrinking the surface for gas exchange; correct.

D. Carbon monoxide in smoke binds haemoglobin and REDUCES oxygen carriage; oxygenation worsens, not improves.

Question Q81 Physics

According to Lenz's Law, the direction of induced current in a conductor is such that it:

- A. Opposes the change in magnetic flux ✓ **Correct answer**
- B. Enhances the change in magnetic flux
- C. Is perpendicular to the magnetic field
- D. Is parallel to the magnetic field

A. Lenz's law: the induced current creates a field that resists the change producing it, conserving energy; correct.

B. Enhancing the change would feed on itself and create energy from nothing, violating conservation of energy.

C. No fixed perpendicular relation defines the current's direction; opposition to flux change does.

D. The current flows in the circuit plane, not parallel to the field; parallelism describes

reaction nor its law.

Question Q82 Physics

In a pure capacitance AC circuit, the current:

- A. Lags behind voltage by 90°
- B. Leads the voltage by 90° ✓ **Correct answer**
- C. Is in phase with the voltage
- D. Leads the voltage by 45°

A. That is the INDUCTOR case: in a pure inductance the current lags the voltage.

B. In a pure capacitor the current peaks a quarter-cycle before the voltage, because current must flow to build the charge that makes the voltage; correct.

C. In-phase current and voltage occur only in a pure resistance.

D. A 45° lead arises in a mixed R–C circuit, not in a pure capacitance.

Question Q83 Physics

In a full-wave rectifier using two diodes, the diodes D1 and D2 operate:

- A. Simultaneously during both half-cycles
- B. In alternate switching mode ✓ **Correct answer**
- C. Only when both ends of transformer are positive
- D. Only in reverse bias condition

A. The two diodes never conduct together: each handles one half-cycle while the other is reverse-biased.

B. D1 conducts on one half-cycle and D2 on the next, alternating through the centre-tapped transformer; correct.

C. The two ends of a centre-tapped secondary are opposite in polarity by design; they are

ositive together.

D. The diodes conduct in forward bias on their half-cycle; reverse bias is when a diode is OFF, not operating. NOTE: stem and options restored 8 Nov 2026 from the faithful Code D reproduction — the transcription had lost the stem's tail ('D1 and D2 operate:') into a truncated option A. Answer text unchanged ('In alternate switching mode'); letter C → B follows the corrected option order.

Question Q84 Physics

The energy of a quantum is given by which equation?

- A. E = mc^2
- B. E = hf ✓ **Correct answer**
- C. E = 1/2 mv^2
- D. E = qV

A. Mass–energy equivalence for rest mass; it is not the energy of a light quantum.

B. Planck's relation: a quantum's energy equals Planck's constant times frequency; correct.

C. The kinetic energy of a moving mass, not the energy carried by a photon.

D. The electrical potential energy of a charge moved through a voltage; it describes charges, not quanta.

Question Q85 Physics

In hydrogen spectrum, the Brackett series lies in

- A. Ultraviolet region
- B. Visible region
- C. Infrared region ✓ **Correct answer**
- D. X ray region

A. Ultraviolet is the Lyman series (transitions down to n = 1).

nt is the Balmer series (down to n = 2).

C. The Brackett series ends at n = 4, with lower-energy photons in the infrared; correct.

D. No hydrogen spectral series lies in the X-ray region; hydrogen's transitions are far lower in energy.

Question Q86 Physics

A car starts from rest and moves with a uniform acceleration of 3m/s^2. What will be its velocity after 5 seconds?

- A. 8m/s
- B. 12m/s
- C. 15m/s ✓ **Correct answer**
- D. 18m/s

A. That would be 3 + 5, adding acceleration and time instead of multiplying them.

B. No combination of u = 0, a = 3 and t = 5 gives 12 under v = u + at.

C. v = u + at = 0 + 3 × 5 = 15 m/s; correct.

D. That would need an acceleration of 3.6 m/s^2, or an extra 3 m/s of initial speed; neither is given.

Question Q87 Physics

A passenger standing in a stationary bus. When the bus suddenly starts moving forward, the passenger falls backward. Which phenomenon best explains this observation?

- A. Friction
- B. Gravity
- C. Inertia ✓ **Correct answer**
- D. Deceleration

between shoes and floor is what eventually drags the passenger forward; it does not explain the backward fall.

B. Gravity pulls the passenger down, not backward; the fall described is horizontal.

C. The passenger's body tends to stay at rest while the bus accelerates forward beneath them, so relative to the bus they topple backward: Newton's first law; correct.

D. The bus is accelerating forward, not decelerating; and deceleration names a motion, not the resistance to change of motion.

Question Q88 Physics

A 0.02kg bullet moving at 300m/s embeds itself in a 2 kg block at rest on a smooth surface. What is the velocity of the block-bullet system just after impact?

- A. 2m/s
- B. 3m/s ✓ **Correct answer**
- C. 4m/s
- D. 5m/s

A. Too low: it ignores part of the bullet's momentum or overstates the combined mass.

B. Momentum is conserved: (0.02 × 300) / (2 + 0.02) = 6 / 2.02 ≈ 2.97 m/s, which rounds to the listed 3 m/s; correct.

C. That would need the bullet's momentum to be about 8 kg·m/s, a third more than it is.

D. That would need a much lighter block or a much faster bullet than those given.

Question Q89 Physics

Which of the following statement about projectile motion is CORRECT?

- A. The horizontal velocity of a projectile changes constantly due to gravity
- B. The vertical velocity of a projectile remains constant throughout the flight

the highest point, the vertical velocity of the projectile is zero, but the horizontal velocity remains unchanged ✓ **Correct answer**

- D. The acceleration of the projectile is zero at the peak of its trajectory

A. Gravity acts vertically only; with air resistance ignored, horizontal velocity stays constant.

B. Vertical velocity changes steadily under gravity, rising to zero at the peak and then downward.

C. The peak is the instant the vertical component vanishes while the horizontal component carries on untouched; correct.

D. Acceleration stays g downward throughout the flight, including at the peak; zero velocity there does not mean zero acceleration.

Question Q90 Physics

The rate of doing work at any instant of time is called:

- A. Work done
- B. Instantaneous power ✓ **Correct answer**
- C. Average power
- D. Mechanical energy

A. Work done is the total energy transferred, not a rate at an instant.

B. Power at one instant, P = dW/dt, is exactly the rate of doing work at that moment; correct.

C. Average power spreads the work over a whole time interval; it is not the rate at a single instant.

D. Mechanical energy (kinetic + potential) is an amount of energy possessed, not a rate of doing work.

Q91 Physics

A 5kg body falls from the height of 30m towards the ground. All its potential energy is converted into heat on impact. What is the heat energy produced?

- A. 1270J
- B. 1370J
- C. 1470J ✓ **Correct answer**
- D. 1570J

A. 200 J short: it corresponds to using g ≈ 8.5 m/s², well below the standard value.

B. 100 J short: it corresponds to g ≈ 9.1 m/s², not the value the options are built on.

C. Potential energy mgh = 5 × 9.8 × 30 = 1470 J, all converted to heat on impact as stated; correct.

D. 100 J too much: it would need g ≈ 10.5 m/s² or a greater height.

Question Q92 Physics

Two students, A and B, each carry a 20kg load to the top of a long staircase. Student A takes 10sec, while student B takes 20sec. Which statement is CORRECT?

- A. Student A does more work than student B
- B. Student B uses more power than student A
- C. Both students do the same amount of work, but student A uses more power ✓ **Correct answer**
- D. Student A and B use the same power since they lifted the same weight

A. Work depends on weight and height, both identical; speed does not change the work done.

B. Backwards: the slower student spreads the same work over twice the time, so uses LESS power.

l, same height, same work, power = work/time, and A takes half the time, so A's power is double; correct.

D. Same weight gives same work, not same power; power also depends on how quickly the work is done.

Question Q93 Physics

If an object is moving anticlockwise along a circular path, in a horizontal plane on a page then the direction of its angular velocity is:

- A. Tangential to any point on the circle
- B. Towards centre of the circle
- C. Perpendicular to the plane and pointing out of the page ✓ **Correct answer**
- D. Perpendicular to the plane and pointing into the page

A. Tangential is the direction of the LINEAR velocity at a point, not of the angular-velocity vector.

B. Toward the centre is the direction of the centripetal acceleration, not of angular velocity.

C. By the right-hand rule, anticlockwise rotation (viewed from above the page) gives an angular-velocity vector pointing out of the page, at right angles to the plane; correct.

D. Into the page is the clockwise sense; it is the reverse of the rotation described.

Question Q94 Physics

If a particle moves along a circular path of radius r with angular displacement θ (in radians), then the arc length s is given by:

- A. rθ ✓ **Correct answer**
- B. r/θ
- C. θ/r

A. The radian is defined so that arc length = radius × angle in radians; correct.

B. Dividing radius by angle gives units of length per radian and shrinks as the angle grows, which cannot describe an arc.

C. Angle divided by radius has units of 1/length, not a length.

D. That is 2π times too large: 2πr is the full circumference (θ = 2π), so 2πrθ double-counts the circle.

Question Q95 Physics

A ball of weight Fg is falling vertically downward through air. If the drag force acting on it at some instant is Fd, what is the Fnet (net force) on the ball?

- A. Fg + Fd
- B. Fg - Fd ✓ **Correct answer**
- C. Fd - Fg
- D. Fd/Fg

A. Adding the forces would mean drag pulls the ball down too; drag opposes the fall, so it must subtract.

B. Weight pulls down, drag pushes up, so the downward net force is weight minus drag; correct.

C. This gives the net force with the opposite sign: it would be the upward net force, negative while the ball is still accelerating down.

D. A ratio of two forces is dimensionless; it cannot be a force.

Question Q96 Physics

Most kinds of fluid flow are turbulent rather than laminar because of:

- o viscosity
- B. Very low velocities
- C. High velocities ✓ **Correct answer**
- D. No resistance

A. A fluid with truly zero viscosity is an idealisation (a superfluid); ordinary flows are turbulent for a different reason, and zero viscosity is unphysical for the flows described.

B. Low velocities favour smooth, laminar flow; they suppress turbulence rather than cause it.

C. Fast flow raises the Reynolds number past the laminar range, so inertia overwhelms viscous damping and the flow breaks into turbulence; correct among the options (turbulence strictly depends on Reynolds number — speed, size and viscosity together — not on speed alone).

D. "No resistance" describes no real fluid and explains nothing about flow patterns.

Question Q97 Physics

According to law of continuity, when the cross-sectional area of a pipe decreases, the fluid velocity:

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

A. For steady incompressible flow, A·v is constant (mass in = mass out), so a smaller area forces a higher speed; correct.

B. Decreasing speed through a narrowing would pile fluid up, violating conservation of mass.

C. Unchanged speed through a smaller area would pass less volume per second, breaking

D. Zero velocity would mean no flow at all, contradicting the steady flow described.

Question Q98 Physics

Water flows steadily through a pipe that gradually narrows. At the wider end, the velocity of water is 1m/s, at the narrower end, the velocity is 3m/s. Which statement is CORRECT about the pressure in the narrower end compared to the wider end?

- A. Pressure is lower at the narrow end because velocity is higher ✓ **Correct answer**
- B. Pressure is higher at the narrow end because velocity is higher
- C. Pressure is the same at both ends since flow is continuous
- D. Pressure is independent of velocity of water

A. Bernoulli's principle for horizontal flow: faster fluid has lower static pressure, so the 3 m/s section is at lower pressure than the 1 m/s section; correct.

B. Reverses Bernoulli: higher speed means lower pressure, not higher.

C. Continuity governs speed, not pressure; the pressures differ exactly because the speeds differ.

D. Bernoulli's equation ties pressure and velocity together; they are not independent.

Question Q99 Physics

What is the necessary condition of a wave motion?

- A. The medium must be elastic ✓ **Correct answer**
- B. The medium must be inelastic
- C. The particles of the medium must be independent of each other
- D. The particles of the medium must not be dependent on each other

A. A displaced particle must be pulled back toward equilibrium and pass the disturbance on; that restoring ability is elasticity; correct.

ic medium would absorb the disturbance as permanent deformation instead of passing it on.

C. Independent particles could not hand the disturbance along; wave motion needs particles to influence their neighbours.

D. This says the same thing as option C in different words; both contradict the coupling a wave requires (the near-duplication is a defect of the options, not of the answer).

Question Q100 Physics

A progressive wave is one which:

- A. Does not vibrate the medium
- B. Carries energy across the medium ✓ **Correct answer**
- C. Propagates only through air
- D. Requires a denser medium for propagation

A. A progressive wave DOES vibrate the medium's particles (transversely or longitudinally) as it passes; a wave that vibrated nothing would carry nothing.

B. A travelling (progressive) wave transports energy from place to place without net transport of the medium; correct.

C. Progressive waves travel through solids, liquids, gases and (for light) vacuum; air is only one medium.

D. No such requirement exists; waves propagate in media of any density, and sound travels faster in denser media but does not require them.

Question Q101 Physics

Speed of sound in air increases with:

- A. Higher temperature, higher humidity ✓ **Correct answer**
- B. Lower temperature, lower humidity

- ner pressure at constant temperature
- D. Higher density at constant elasticity

A. Sound speed in a gas rises with temperature ($v \propto \sqrt{T}$), and humid air is less dense than dry air at the same pressure, giving a small further increase; correct.

B. Both changes lower the speed: colder air is slower, and drier air is denser.

C. At fixed temperature, raising pressure raises density in the same proportion, so $v = \sqrt{(\gamma P/\rho)}$ is unchanged for an ideal gas.

D. Speed falls as density rises at fixed elasticity ($v = \sqrt{(E/\rho)}$); higher density alone slows sound down.

Question Q102 Physics

A wave has velocity 300m/s and frequency 100Hz. If the medium is changed so that velocity doubles but frequency remains constant, the new wavelength will be:

- A. Halved
- B. Doubled ✓ **Correct answer**
- C. Same
- D. Zero

A. Halving would follow if the frequency doubled, not the velocity.

B. Wavelength $\lambda = v/f$: originally 300/100 = 3 m; with v = 600 m/s and f = 100 Hz, λ = 6 m, double; correct.

C. The wavelength cannot stay the same when the speed doubles at fixed frequency.

D. A zero wavelength would mean no wave at all; the wave still exists with a longer wavelength.

Q103 Physics

When a particle executing simple harmonic motion moves from the mean position to the extreme position, its kinetic energy:

- A. Increases continuously
- B. Decreases continuously and becomes zero at the extreme position ✓ **Correct answer**
- C. Remains constant throughout the motion
- D. Becomes maximum at the extreme position

A. Kinetic energy is at its maximum at the mean position, so moving away from it can only reduce it.

B. Speed falls steadily as potential energy grows, reaching zero velocity (hence zero kinetic energy) at the turning point; correct.

C. Total energy is constant, not kinetic energy; kinetic and potential energy trade places continuously.

D. At the extreme the potential energy is maximum and the kinetic energy is zero, the reverse of this claim.

Question Q104 Physics

Heat will spontaneously flow from:

- A. Lower to higher internal energy only
- B. High pressure to low pressure
- C. High to low temperature ✓ **Correct answer**
- D. Low temperature to high temperature

A. Internal energy is not the driver; a small hot body (low total internal energy) still loses heat to a large cold body.

B. Pressure differences drive bulk fluid flow, not the direction of spontaneous heat flow.

d law: heat flows spontaneously from the hotter body to the colder one until temperatures equalise; correct.

D. Heat flows cold-to-hot only with work input (a refrigerator); spontaneously it never does.

Question Q105 Chemistry

At a constant Pressure (Cp) and Volume (Cv), an ideal gas has Cv=3/2R. Then Cp will be?

- A. R
- B. 3/2R
- C. 5/2R ✓ **Correct answer**
- D. 7/2R

A. Cp = Cv + R = 3/2R + R = 5/2R, not R.

B. 3/2R is the GIVEN Cv (monatomic), not Cp; using it as Cp forgets to add R.

C. Cp = Cv + R = 3/2R + R = 5/2R; correct.

D. 7/2R is Cp for a DIATOMIC gas (Cv = 5/2R, plus R); the stem gives Cv = 3/2R, so the gas is monatomic and D cannot apply. DECIDED 8 Nov 2026 by assistant under the owner's 8 Nov delegation: the dispute is dissolved by the faithful Code D reproduction, read visually from its rendered page — the stem gives Cv = 3/2R (monatomic), so Cp = Cv + R = 5/2R uniquely; the diatomic reading (D) cannot apply. The transcription had dropped the given Cv value (rendering it as "Cp − Cv = R"), which created the apparent C-vs-D ambiguity; the batch and big-block addenda misread the reproduction's stem as "Cp = 3/2R" (a subscript misread, corrected here from the rendered page). The official key (Code D 112 = C, two agreeing copies) agrees.

Note: Decided 8 Nov 2026 by assistant under the owner's 8 Nov 2026 delegation: the faithful Code D reproduction, read visually from its rendered page, gives Cv = 3/2R (monatomic) in the stem, so Cp = Cv + R = 5/2R uniquely; the diatomic reading (D) cannot apply. The transcription had dropped the given Cv value (rendering it as 'Cp − Cv = R'); the

g-block addenda misread the reproduction's stem as 'Cp = 3/2R' (a subscript misread, corrected from the rendered page). The official key (Code D 112 = C, two agreeing copies) agrees.

Question Q106 Physics

The electric field at a point is defined as:

- A. Potential per unit charge
- B. Work done per unit time
- C. Charge per unit area
- D. Force per unit positive test charge ✓ **Correct answer**

A. Potential IS work per unit charge, not potential per unit charge; the wording is circular and wrong.

B. Work per unit time is power, not electric field.

C. Charge per unit area is surface charge density (σ), not field strength.

D. E = F/q for a small positive test charge is the definition of electric field; correct.

Question Q107 Physics

Coulomb's law fits well into:

- A. Newton's 1st law
- B. Newton's 2nd law
- C. Newton's 3rd law ✓ **Correct answer**
- D. Gauss's law

A. The first law describes inertia and equilibrium, not the pairwise force between two charges.

B. The second law (F = ma) tells what a force does to a mass; it does not describe the equal-and-opposite pairing of the electrostatic force.

s force on each charge is equal in size and opposite in direction to the force on the other: an action–reaction pair; correct.

D. Gauss's law restates electrostatics in flux form and is consistent with Coulomb's law, but the "fits well into" pairing the question tests is the action–reaction character, i.e. the third law.

Question Q108 Physics

The work done in moving a unit positive charge from one point to another while keeping the charge in electrostatic equilibrium is called:

- A. Kinetic energy
- B. Potential energy
- C. Elastic potential energy
- D. Potential difference ✓ **Correct answer**

A. Kinetic energy is the energy of motion; the charge is moved in equilibrium (no acceleration), so no kinetic-energy change is being named.

B. Potential energy is the work for a GIVEN charge (W = qV); dividing by the unit charge gives the difference of potential, not the energy.

C. Elastic potential energy belongs to stretched springs and deformed solids, not to charges in an electric field.

D. Work per unit charge between two points is the definition of potential difference (voltage); correct.

Question Q109 Physics

If the potential difference (V) across a conductor is doubled, keeping resistance (R) constant, the power dissipated (P) becomes:

- A. Doubled

- C. Four times ✓ **Correct answer**
- D. Remains unchanged

A. Power does not scale linearly with voltage; doubling V while R is fixed more than doubles the dissipation.

B. Halving would follow from halving the voltage or doubling the resistance, neither of which happens.

C. $P = V^2/R$, so $(2V)^2/R = 4V^2/R$: four times the original power; correct.

D. Unchanged power would require the voltage (or resistance) to stay as it was; the voltage doubles.

Question Q110 Chemistry

Consider the chlorination of methane to methyl chloride, the attack of chlorine free radical on methane, occurs in which phase?

- A. Before initiation
- B. Initiation
- C. Propagation ✓ **Correct answer**
- D. Termination

A. "Before initiation" is no stage of a chain reaction; radicals do not yet exist before initiation.

B. Initiation is the splitting of Cl_2 into two chlorine radicals by light/heat; no methane is attacked there.

C. $Cl\bullet + CH_4 \rightarrow HCl + CH_3\bullet$, followed by $CH_3\bullet + Cl_2 \rightarrow CH_3Cl + Cl\bullet$, is the chain-carrying propagation sequence that regenerates a radical at each step; correct.

D. Termination joins two radicals together and ends chains; it creates no new radical and

ethane.

Question Q111 Biology

A patient with pancreatic insufficiency shows reduced activity of an enzyme that hydrolyzes the first peptide bond at the carboxyl end of proteins and peptides. Which enzyme is deficient?

- A. Elastase
- B. Pepsin
- C. Carboxypeptidase ✓ **Correct answer**
- D. Collagenase

A. Elastase cuts internal peptide bonds in elastin and other proteins; it is an endopeptidase, not a carboxyl-end trimmer.

B. Pepsin is a stomach endopeptidase that cuts inside protein chains; it does not work from the carboxyl end and is not a pancreatic enzyme.

C. A pancreatic exopeptidase that removes amino acids one by one from the carboxyl (C-terminal) end; correct.

D. Collagenase cuts collagen's triple helix at internal sites; it is not the general carboxyl-end enzyme of pancreatic juice.

Question Q112 Chemistry

In an electrolytic cell when the current passes through a solution, the anode is:

- A. a positive electrode where oxidation occurs ✓ **Correct answer**
- B. a negative electrode where oxidation occurs
- C. a negative electrode where reduction occurs
- D. a positive electrode where reduction occurs

A. In an electrolytic cell the external supply makes the anode positive, and oxidation (loss

always occurs at the anode, correct.

B. The oxidation half is right but the sign is wrong: the negative electrode is the cathode.

C. That describes the CATHODE of the electrolytic cell, not the anode.

D. Reduction never occurs at the anode; the positive sign is right but the process is backwards.

Question Q113 Chemistry

An increase in the internal energy of a chemical system can lead to all EXCEPT:

- A. An increase in temperature due to rise in kinetic energy of molecules
- B. A phase change such as melting or evaporation
- C. A chemical reaction if energy supplied is sufficient to break bonds
- D. An increase in temperature due to drop in kinetic energy of molecules ✓ **Correct answer**

A. Added internal energy can raise molecular kinetic energy, which is what temperature measures; a genuine consequence.

B. Added energy can break intermolecular bonds instead of raising temperature, melting or vaporising the substance; a genuine consequence.

C. Enough added energy can break bonds and start a reaction; a genuine consequence.

D. Self-contradictory: temperature rises when average kinetic energy rises, not when it drops; this is the exception; correct.

Question Q114 Chemistry

In ethene molecule, each carbon atom has three hybridized sp2 orbitals which are:

- A. Coplanar ✓ **Correct answer**
- B. Tetrahedral

- D. Pyramidal

A. The three sp^2 orbitals on each ethene carbon lie in one plane at 120° to each other, forming the flat σ-framework, with the unhybridised p orbital above and below the plane for the π bond; correct.

B. Tetrahedral geometry belongs to sp^3 carbons (e.g. ethane), with four orbitals at ~109.5°, not to ethene.

C. Linear geometry belongs to sp carbons (e.g. ethyne), with two orbitals at 180°.

D. Pyramidal geometry belongs to molecules with a lone pair (e.g. ammonia); ethene's carbons have no lone pair and are flat.

Question Q115 Chemistry

Which of the following best explains the reaction between Beryllium (Be) and Oxygen (O)?

- A. Be burns vigorously with oxygen forming a layer of BeO, which accelerates the oxidation of remaining metal
- B. Be reacts with oxygen forming a layer of BeO, which protects the metal from further oxidation ✓ **Correct answer**
- C. Be reacts slowly with oxygen to form a volatile oxide BeO, which evaporates quickly
- D. Be is the only alkaline earth metal that doesn't react with oxygen

A. The oxide layer does the opposite: it seals the surface and slows further attack, and beryllium does not burn vigorously in air at ordinary temperatures.

B. Beryllium passivates: a thin, adherent BeO film blocks oxygen from the metal beneath; correct.

C. BeO is a refractory solid (very high melting point), not a volatile oxide that evaporates.

does react with oxygen to form BeO; what sets it apart is the protective film, not non-reaction.

Question Q116 Chemistry

The value of R in atm.dm3.mol-1.K-1 is:

- A. 0.0821 ✓ **Correct answer**
- B. 0.821
- C. 62.4
- D. 8.314

A. In litre·atm units (1 dm^3 = 1 L), R = 0.0821 $L \cdot atm \cdot mol^{-1} \cdot K^{-1}$; correct.

B. Ten times too large; a misplaced decimal point.

C. 62.4 is R in $L \cdot mmHg\ (torr) \cdot mol^{-1} \cdot K^{-1}$, the value for pressure in mmHg, not $atm \cdot dm^3$.

D. 8.314 is R in joules ($J \cdot mol^{-1} \cdot K^{-1}$), the SI value, not the $atm \cdot dm^3$ value.

Question Q117 Chemistry

The rate of a chemical reaction changes with:

- A. Concentration of reactant molecules ✓ **Correct answer**
- B. Concentration of product molecules
- C. Concentration of both reactant and product
- D. Rate constant

A. The forward rate law is written in reactant concentrations (rate = $k[A]^m[B]^n$), so changing them changes the rate; correct on the textbook convention.

B. Product concentration does not appear in the forward rate law; products affect the reverse rate in a reversible reaction, not the forward rate as asked.

C. The net rate of a reversible reaction involves both, but the rate law for the reaction as

lly stated depends on reactants; this option overstates the product's role.

D. The rate constant k is a parameter of the rate law, fixed at a given temperature; it is not a concentration variable that the rate "changes with". NOTE: the answer rests on the forward-rate-law convention; for a reversible reaction the net rate also responds to product concentration. Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (134 = A, two agreeing copies) agrees.

Note: Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov 2026 delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (134 = A, two agreeing copies) agrees. The answer rests on the forward-rate-law convention; for a reversible reaction the net rate also responds to product concentration.

Question Q118 Chemistry

According to Planck's quantum theory, if the frequency of photon is doubled, the value of 'h' will be:

- A. Doubled
- B. Increased 3 times
- C. Increased 4 times
- D. Unchanged ✓ **Correct answer**

A. Doubling is the answer for the value of hf (E = hf, linear in f), not for h itself.

B. h does not change at all when the frequency changes; a threefold rise would need the frequency to triple, and even then it is hf that rises, not h.

C. h does not change at all; a fourfold rise would need the frequency to quadruple, and even then it is hf that rises, not h.

D. h is Planck's constant, a fixed universal constant; it does not change when the frequency changes; correct. DECIDED 8 Nov 2026 by assistant under the owner's 8 Nov

he faithful Code D reproduction prints the stem as "the value of 'h'" (read visually from its rendered page) and keys D, and the taleem360 key sheet agrees (135 = D, two agreeing copies); the transcription's "hf" is the outlier, and under the 'hf' wording the answer would be A. The 'h' stem and answer D are adopted.

Note: Decided 8 Nov 2026 by assistant under the owner's 8 Nov 2026 delegation: the faithful Code D reproduction prints the stem as "the value of 'h'" (read visually from its rendered page) and keys D, and the taleem360 key sheet agrees (135 = D, two agreeing copies); the transcription's 'hf' is the outlier, and under the 'hf' wording the answer would be A.

Question Q119 Chemistry

The specific rate constant (k) of a reaction is related to the concentration of reactants:

- A. Directly
- B. Inversely
- C. Exponentially
- D. Independently ✓ **Correct answer**

A. k does not rise when concentrations rise; the RATE rises, while k stays fixed at a given temperature.

B. k does not fall when concentrations rise either; concentration has no effect on k.

C. No exponential link exists between k and concentration; temperature affects k exponentially (Arrhenius), concentration does not.

D. k depends on temperature and activation energy, not on how much reactant is present; correct.

Question Q120 Biology

An experiment shows that heating a 'protein' disrupts the alpha helix structure. Which protein structure is mainly affected?

- B. Secondary structure ✓ **Correct answer**
- C. Tertiary structure
- D. Quaternary structure

A. Primary structure is the amino-acid sequence joined by covalent peptide bonds; ordinary heating does not break those bonds.

B. The α-helix IS secondary structure, held by hydrogen bonds along the backbone, which heat disrupts; correct.

C. Tertiary structure is the overall 3-D folding; heating affects it too, but the helix itself is the secondary-structure element named in the question.

D. Quaternary structure is the assembly of separate subunits; a single helix is not a subunit assembly.

Question Q121 Chemistry

Which of the following is NOT a postulate of kinetic molecular theory of gases?

- A. Gas molecules undergo elastic collision
- B. Gas molecules are in continuous random motion
- C. Gas molecules do not exert pressure when molecules collide with wall of container ✓ **Correct answer**
- D. Gas molecules are far away from each other

A. A genuine postulate: collisions conserve kinetic energy, with no net loss.

B. A genuine postulate: molecules move ceaselessly in straight lines in all directions.

C. The opposite of the theory: gas pressure IS the result of molecules colliding with the container walls, so this is not a postulate; correct.

D. A genuine postulate: the volume of the molecules themselves is negligible and the

een them are large.

Question Q122 Chemistry

Spectral series for hydrogen spectrum are :

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

A. Two names only Lyman and Balmer, leaving out Paschen, Brackett and Pfund entirely.

B. Three names still omit at least two established series.

C. The printed key, but WRONG: four counts Lyman, Balmer, Paschen and Brackett, but omits Pfund.

D. Five named series are established: Lyman (n = 1), Balmer (n = 2), Paschen (n = 3), Brackett (n = 4) and Pfund (n = 5); a sixth, Humphreys (n = 6), is also named in fuller treatments; correct. VERIFIED: Vedantu + adichemistry — five named series are established: Lyman, Balmer, Paschen, Brackett and Pfund. (The Code D reproduction keys 5 at C under its own option order (2, 3, 5, 7) — confirming the corrected answer.)

Note: The printed key C is corrected openly: the reproduction keys 5 at C under its own option order (2, 3, 5, 7) — confirming the corrected answer D (5 named series: Lyman, Balmer, Paschen, Brackett, Pfund).

Question Q123 Chemistry

The most electronegative element in periodic table is:

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

A. Fluorine has the highest electronegativity (Pauling 4.0), attracting shared electrons more strongly than any other element; correct.

B. Chlorine is highly electronegative (3.16) but below fluorine in its group and below oxygen.

C. Nitrogen (3.04) is less electronegative than oxygen and fluorine.

D. Oxygen (3.44) is second only to fluorine, but still below it.

Question Q124 Chemistry

If ΔH for a reaction is positive, then by decreasing temperature, the reaction will

- A. Move forward
- B. Move in reverse ✓ **Correct answer**
- C. Have no effect
- D. Be both forward and reverse

A. Forward is the endothermic direction here; cooling disfavours the direction that absorbs heat.

B. A positive ΔH means the forward reaction is endothermic, so lowering the temperature shifts equilibrium toward the exothermic (reverse) direction, by Le Chatelier's principle; correct.

C. Temperature always shifts an equilibrium with non-zero ΔH; "no effect" would require ΔH = 0.

D. Equilibrium always involves both directions microscopically; the question asks which way the position SHIFTS, and that is reverse.

Q125 Chemistry

The addition of water to propene in the presence of sulfuric acid produces:

- A. Propane
- B. Propan-2-ol ✓ **Correct answer**
- C. Butanol
- D. Ethanol

A. Propane would need addition of hydrogen (H_2), not water; hydration adds OH as well as H across the double bond.

B. Acid-catalysed hydration adds OH to the more substituted carbon (Markovnikov), giving CH_3–CH(OH)–CH_3, propan-2-ol; correct.

C. Butanol has four carbons; propene has only three, so no butanol can form.

D. Ethanol has two carbons and comes from ethene, not from three-carbon propene.

Question Q126 Chemistry

In which of the following molecules does the central atom use sp2 hybridization?

- A. PH3
- B. NH3
- C. BH3 ✓ **Correct answer**
- D. SbH3

A. Phosphine is pyramidal with a lone pair; its bonding is best described as largely unhybridised p-orbital bonding (bond angle ~93°), not sp^2.

B. Ammonia is pyramidal with a lone pair (sp^3-like, bond angle ~107°); it is not trigonal planar sp^2.

C. Borane has three bonding pairs, no lone pair, and a trigonal planar shape from sp^2 hybridisation on boron; correct.

ke phosphine, is pyramidal with bond angles near 91°, from near-pure p bonding, not sp^2.

Question Q127 Chemistry

In a molecule of phenol, the carbon atom which is attached to -OH group is:

- A. sp hybridized
- B. sp2 hybridized ✓ **Correct answer**
- C. sp3 hybridized
- D. unhybridized

A. sp carbons are linear (as in alkynes); no ring carbon of benzene is linear.

B. The carbon bearing the OH is part of the aromatic ring: trigonal planar, sp^2, with a p orbital in the delocalised π system; correct.

C. sp^3 carbons are tetrahedral and saturated; a benzene-ring carbon is neither.

D. Every ring carbon in phenol is hybridised; the lone pair on oxygen conjugates with the ring precisely because the carbon is sp^2.

Question Q128 Chemistry

Which one of the following is a planar molecule?

- A. NH3
- B. H2O
- C. BF3 ✓ **Correct answer**
- D. CH4

A. Ammonia is trigonal pyramidal: the nitrogen sits above the plane of the three hydrogens.

B. Water is bent (angular); its three atoms define a plane but the molecule's shape is bent, not the planar trigonal geometry the question tests, and it is not flat in the BF_3 sense.

uoride is trigonal planar: boron and all three fluorines lie in one plane at 120°; correct.

D. Methane is tetrahedral, the classic non-planar shape.

Question Q129 Chemistry

Which of the following has highest bond energy?

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

A. The H–Cl bond (431 kJ/mol) is strong, but weaker than H–F.

B. The H–I bond (299 kJ/mol) is the weakest of the four: the large iodine atom overlaps poorly with hydrogen's small 1s orbital.

C. The H–F bond (565 kJ/mol) is the strongest: fluorine is small, the overlap is excellent, and the bond has strong partial ionic character; correct.

D. The H–Br bond (366 kJ/mol) sits between HCl and HI, well below HF.

Question Q130 English

In the sentence "Jogging every morning improves my mood," what role does the gerund phrase play?

- A. Object of a verb
- B. Direct object
- C. Predicative noun
- D. Subject ✓ **Correct answer**

A. An object receives the action of a verb; "jogging every morning" does the improving, it does not receive it.

ject follows the verb ("I enjoy jogging"); here the phrase stands BEFORE the verb.

C. A predicative noun follows a linking verb ("My hobby is jogging"); there is no linking verb here.

D. "Jogging every morning" is what the sentence is about and what performs "improves"; the gerund phrase is the subject; correct.

Question Q131 English

The meeting has been scheduled ___ 3 p.m. sharp.

- A. on
- B. at ✓ **Correct answer**
- C. in
- D. to

A. "On" is used for days and dates ("on Monday", "on 3 May"), not for clock times.

B. "At" is the preposition for a precise clock time ("at 3 p.m."); correct.

C. "In" is used for months, years and longer periods ("in June", "in 2025"), not for a time of day.

D. "To" marks direction or a limit ("from 2 to 3"), not the time at which something is scheduled.

Question Q132 English

"She studied hard; _____, she passed the exam with distinction." Choose the CORRECT transitional device:

- A. however
- B. for instance
- C. consequently ✓ **Correct answer**

ontrast

A. "However" signals contrast; passing after hard study is a result, not a contrast.

B. "For instance" introduces an example; the second clause is not an example of the first.

C. "Consequently" marks result: she passed AS A RESULT of studying hard; correct.

D. "In contrast" opposes two things; nothing here is being contrasted.

Question Q133 English

She completed the task with great difficulty. Identify the CORRECT usage of passive voice.

- A. The task was completed with great difficulty by her. ✓ **Correct answer**
- B. The task has been completed with great difficulty by her.
- C. The task was been completed with great difficulty by her.
- D. The task was being completed with great difficulty by her.

A. The original is simple past active ("completed"), so the matching passive is simple past passive ("was completed"); correct.

B. Present perfect passive; it changes the tense from the simple past of the original.

C. Ungrammatical: "was been" is not a valid verb form in any tense.

D. Past continuous passive; it turns a finished action into an ongoing one, changing the meaning.

Question Q134 English

Each of the boys _____ ambitious to lead the team.

- A. have
- B. has
- C. is ✓ **Correct answer**

A. "Have" is plural and an auxiliary/main verb for possession, not a linking verb that can carry the adjective "ambitious".

B. "Has" is singular but likewise expresses possession ("has a book"); it cannot be followed by the adjective complement "ambitious" here.

C. "Each" takes a singular verb, and the linking verb "is" joins the subject to the adjective "ambitious"; correct.

D. "Are" is plural, disagreeing with the singular subject "each".

Question Q135 English

"Revenge is a kind of wild justice." The sentence illustrates the use of:

- A. Personification
- B. Pun
- C. Metaphor ✓ **Correct answer**
- D. Hyperbole

A. Personification gives human qualities to a non-human thing; nothing here is given human traits.

B. A pun plays on two meanings of a word; no wordplay is involved.

C. "Revenge" is directly identified with "wild justice" without "like" or "as": a direct comparison, i.e. a metaphor (Bacon's famous line); correct.

D. Hyperbole is deliberate exaggeration for effect; the sentence compares rather than exaggerates a quantity.

Question Q136 English

The old man was feeble, barely able to walk. The word 'feeble' means:

lthy

- B. Weak ✓ **Correct answer**
- C. Strong
- D. Fat

A. The opposite: a healthy man would not be barely able to walk.

B. "Feeble" means physically weak and frail, matching the context of barely walking; correct.

C. The opposite of feeble; strength is what the old man lacks.

D. Fatness is about body size, not about the frailty the sentence describes.

Question Q137 English

Which literary device involves using words or phrases that convey the opposite of their literal meaning?

- A. Irony ✓ **Correct answer**
- B. Parody
- C. Satire
- D. Sarcasm

A. Irony is saying the opposite of what is meant, with the intended meaning understood from context; correct on the textbook definition.

B. Parody imitates a work or style for comic effect; imitation, not opposite meaning, defines it.

C. Satire criticises folly through ridicule; it may USE irony, but its definition is criticism, not opposite meaning as such.

D. Sarcasm is a sharp, mocking form of irony that also uses opposite meaning, so it is the closest rival; the broader device the question asks for is irony, of which sarcasm is a

TE: the answer rests on the textbook convention that names the broad device (irony) rather than its subtype (sarcasm). Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (170 = A, two agreeing copies) agrees.

Note: Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov 2026 delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (170 = A, two agreeing copies) agrees. The answer rests on the textbook convention that names the broad device (irony) rather than its subtype (sarcasm).

Question Q138 English

All of the players forgot ____ jerseys.

- A. his
- B. her
- C. them
- D. their ✓ **Correct answer**

A. "His" is singular and masculine; the subject "players" is plural and of unspecified gender.

B. "Her" is likewise singular (and feminine); it cannot agree with plural "players".

C. "Them" is an object pronoun ("forgot them"), not a possessive; it cannot stand before the noun "jerseys".

D. The plural possessive "their" agrees with "players" and correctly modifies "jerseys"; correct.

Question Q139 Logical Reasoning

A medication dose starts at 100mg and halves each day. What will be the dose on day 4?

- 5mg ✓ **Correct answer**
- B. 25mg
- C. 30mg
- D. 50mg

A. Counting the starting dose as day 1: day 1 = 100 mg, day 2 = 50 mg, day 3 = 25 mg, day 4 = 12.5 mg; correct on that counting, which the options require.

B. That is the day-3 dose in the same sequence, one halving too few.

C. No halving step gives 30 mg from 100 mg; it fits no term of the sequence.

D. That is the day-2 dose, one halving only.

Question Q140 Logical Reasoning

A library has 4 books on Shelf A, and 8 books on Shelf B. Some books are removed from Shelf B such that both shelves now have exactly the same number of books. How many books were removed from Shelf B?

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

A. Removing 1 leaves 7 on Shelf B against 4 on Shelf A: not equal.

B. Removing 2 leaves 6 against 4: still not equal.

C. Removing 3 leaves 5 against 4: still one too many.

D. Removing 4 leaves 8 − 4 = 4, exactly matching Shelf A; correct. NOTE: the Code D reproduction prints the same stem with different options (A. 2 · B. 4 · C. 6 · D. 8) and keys C (6) — which fits NEITHER option set as printed (6 removed leaves 2 on Shelf B against 4 on Shelf A). DECIDED 8 Nov 2026 by assistant under the owner's 8 Nov delegation: the key

key error — the stem ("4 books on Shelf A", agreed by the transcription and both reproductions) and the arithmetic (8 − 4 = 4) both give 4, so the filed answer D stands; a key does not overturn a derivation. The reproduction's option set and key letter are recorded here, not hidden (see big-block addendum §1.6).

Note: Decided 8 Nov 2026 by assistant under the owner's 8 Nov 2026 delegation: the key letter C (6) is a key error — it fits neither option set under the agreed stem (4 books on Shelf A); the arithmetic (8 − 4 = 4) gives D. The Code D reproduction prints the same stem with different options (A. 2 · B. 4 · C. 6 · D. 8) and keys C (6). A key does not overturn a derivation.

Question Q141 Logical Reasoning

Ahmed ranks 10th in the class of 46 students. There are only 7 students below Bilal rank wise. How many students are there between Ahmed and Bilal?

- A. 27
- B. 28 ✓ **Correct answer**
- C. 30
- D. 32

A. One short: it forgets that the count between two ranks excludes both named students but the arithmetic 39 − 10 − 1 = 28, not 27.

B. Bilal has 7 below him, so his rank is 46 − 7 = 39th; students between 10th and 39th = 39 − 10 − 1 = 28; correct.

C. That would place Bilal at rank 41, i.e. only 5 students below him, contradicting the given 7.

D. That would place Bilal at rank 43, i.e. only 3 below him, contradicting the given 7.

Question Q142 Logical Reasoning

How is Ali related to Mustafa? If Ali says, "Mustafa's mother is the only child of my

- A. Brother ✓ **Correct answer**
- B. Cousin
- C. Uncle
- D. Father

A. Mustafa's mother, as the only child of Ali's grandmother, is Ali's parent; Mustafa, her child, is therefore Ali's sibling, and among the options "brother"; correct.

B. Cousins share grandparents through different parents; here Mustafa's mother IS Ali's parent, not Ali's aunt, so cousinship does not follow.

C. An uncle is a parent's sibling; Mustafa is a generation below Ali's parent, not alongside it.

D. Mustafa would have to be Ali's parent to be his father; the statement makes Mustafa the child of Ali's parent, i.e. Ali's own generation. (Strictly, the two may be half-brothers through a shared parent; no half-brother option is offered, and "brother" is the relationship the options intend.)

Question Q143 Logical Reasoning

A mobile company is deciding whether to collect personal user data for improving advertisement. Which of the following is a moral argument against collecting the data?

- A. Users may lose trust in the company, which could hurt profits.
- B. It is wrong to collect data without users' clear and informed consent. ✓ **Correct answer**
- C. Competitors already collect more data, and we need to stay competitive.
- D. More data means more accurate advertising, which boosts sales.

A. A business-consequence argument (trust and profit), not a moral claim about right and wrong.

argument: collecting personal data without informed consent violates autonomy and is wrong in itself, whatever the profits; correct on the moral-vs-pragmatic classification.

C. A competitive argument FOR collecting, not a moral argument against it.

D. A business-benefit argument for collecting, not an argument against it. NOTE: the answer rests on the moral-argument classification convention (consent/rights vs business consequences); no other option states a rights-based objection. Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (176 = B, two agreeing copies) agrees.

Note: Promoted SINGLE-SOURCE → VERIFIED 8 Nov 2026 (decided by assistant under the owner's 8 Nov 2026 delegation): one source is FINAL under the owner's 8 Nov 2026 verification standard, and the Code D key (176 = B, two agreeing copies) agrees. The answer rests on the moral-argument classification convention (consent/rights vs business consequences).

Question Q144 Logical Reasoning

A father is 5 years older than twice his son's age. If the son is 12, what is the father's age?

- A. 28 years
- B. 29 years ✓ **Correct answer**
- C. 30 years
- D. 32 years

A. That is 2 × 12 + 4, one year short of the "5 years older" in the statement.

B. Twice the son's age is 2 × 12 = 24, plus 5 = 29 years; correct.

C. That would need the son to be 12.5, or "6 years older", neither of which is given.

d need the son to be 13.5, or "8 years older"; it matches neither figure given.

Question Q145 Logical Reasoning

Which number comes in the missing place? 200, 180, 162, 146, 132, _____

- A. 118
- B. 120 ✓ **Correct answer**
- C. 122
- D. 126

A. That would need the next drop to be 14 again, but the drops are shrinking by 2 each time, so the next drop is 12, not 14.

B. The drops are −20, −18, −16, −14, shrinking by 2 each step, so the next drop is −12: 132 − 12 = 120; correct.

C. That would need a drop of 10, skipping the −12 step in the shrinking-drops pattern.

D. That would need a drop of only 6, breaking the pattern entirely.

Question Q146 Logical Reasoning

If 5 boxes of soap weigh 75 kilos and each box when empty weighs 3 kilos. What is total weight of the soaps?

- A. 15
- B. 30
- C. 45
- D. 60 ✓ **Correct answer**

A. 15 kg is the weight of the five EMPTY boxes (5 × 3), not of the soap inside them.

B. No step in the calculation gives 30: it is neither the boxes' weight, nor the soap's, nor the total.

d follow from subtracting 30 (two boxes' worth too many) instead of 15.

D. Empty boxes weigh 5 × 3 = 15 kg, so the soap weighs 75 − 15 = 60 kg; correct. (Options print bare numbers; kilos are understood from the stem.)

Question Q147 Logical Reasoning

Consider the sequence: 64, 32, 16, 8, … What is the 10th term of this sequence?

- A. 2
- B. 4
- C. 1/4
- D. 1/8 ✓ **Correct answer**

A. 2 is the 6th term (64, 32, 16, 8, 4, 2), not the 10th.

B. 4 is the 5th term, only one halving past the given 8.

C. 1/4 is the 9th term (…1, 1/2, 1/4), one halving short of the 10th.

D. Halving each time: terms 1–10 are 64, 32, 16, 8, 4, 2, 1, 1/2, 1/4, 1/8; the 10th term is $64 \times (1/2)^9 = 1/8$; correct.

Question Q148 (printed 87) Physics

Which of the following statement best describes the nature of nuclear decay?

- A. It occurs both spontaneously and randomly ✓ **Correct answer**
- B. It occurs only when external energy is supplied
- C. It occurs at regular time intervals for each atom
- D. It can be controlled by temperature and pressure

A. Radioactive decay is by nature spontaneous and random — an unstable nucleus decays without any external trigger, unaffected by temperature, pressure or chemical state, and the moment of decay of any one atom cannot be predicted (OCR A-Level notes; DSE notes).

decay needs no external energy, it is spontaneous.

C. Wrong: decay is random for individual atoms; only the half-life of a large sample is regular.

D. Wrong: the decay rate is unaffected by temperature, pressure or chemical state. NOTE: the option set is corrected 8 Nov 2026 from the faithful Code D reproduction; the examoo PDF printed a different option set for the same stem (spontaneous emission / electron capture / beta / alpha).

Question Q149 (printed 92) Physics

A ball is projected at an angle of 45° with an initial speed of 20 m/s on earth. How does R_w (Range without air resistance) compare to R_a (Range with air resistance)?

- A. R_w will be greater than R_a because air resistance reduces horizontal speed ✓ **Correct answer**
- B. R_w will be equal to R_a because gravity is unchanged
- C. R_w will be lesser than R_a because air resistance reduces horizontal speed
- D. R_w will be lesser than R_a because air resistance is random

A. Air resistance (drag) opposes motion and removes horizontal speed throughout the flight, so the range with air resistance is shorter.

B. Gravity being unchanged does not remove the drag effect.

C. Contradicts its own reason: if air resistance reduces horizontal speed, the range with air resistance is shorter, not longer.

D. Air resistance is not random; it opposes motion systematically. NOTE: the Code D reproduction prints the same question with the symbol definitions swapped (Rw = WITH air resistance, RA = WITHOUT; read visually from its rendered page) and keys C. Under the filed definitions (Rw = without, Ra = with) the reproduction's key C states the same physics as this file's A — range with air resistance is shorter than range without — so there is no physics conflict, only a definition swap in the reproduction's stem print; under the

n's own swapped definitions its key C would be wrong. The derivation (drag removes horizontal speed, so the range with air resistance is shorter) is decisive and the filed answer A stands. (The big-block addendum §1.5 listed this as a key-vs-derivation conflict; the rendered page shows it is a definition swap, corrected here.)

Note: Decided 8 Nov 2026 by assistant under the owner's 8 Nov 2026 delegation: the Code D reproduction prints the same question with the symbol definitions swapped (Rw = WITH air resistance, RA = WITHOUT; read visually from its rendered page) and keys C. Under the filed definitions (Rw = without, Ra = with) the reproduction's key C states the same physics as this file's A, so there is no physics conflict, only a definition swap in the reproduction's stem print.

Question Q150 (printed 111) Physics

The SI unit of molar specific heat is:

- A. J mol^{-1} K^{-1} ✓ **Correct answer**
- B. J mol^{-1} K^{-1} K^{-1}
- C. J mol^{-1} K^{-1} K^{-1} K^{-1}
- D. J mol^{-1} K^{-1} K^{-1} K^{-1} K^{-1}

A. Molar specific heat is heat per mole per kelvin: J·mol^{-1}·K^{-1}.

B. The extra K^{-1} factors are dimensionally wrong.

C. The extra K^{-1} factors are dimensionally wrong.

D. The extra K^{-1} factors are dimensionally wrong. NOTE: the Code D reproduction prints the dimensionally correct unit (J·mol^{-1}·K^{-1}) at D in its own option order (read visually from its rendered page: A. J mole · B. J mole K · C. J mole K^{-1} · D. J $mole^{-1}K^{-1}$), while the transcription, the examoo reproduction and the official key (111 = A, two agreeing copies) all place it at A; the file keeps A so the answer letter matches the official key. The unit itself is verified by derivation.

Note: The Code D reproduction prints the dimensionally correct unit (J·mol^{-1}·K^{-1}) at D in its

order (read visually from its rendered page), while the transcription, the examoo reproduction and the official key (111 = A, two agreeing copies) all place it at A; the file keeps A so the answer letter matches the official key.

Question Q151 (printed 126) Chemistry

The K_sp value of salt AB → $A^+ + B^-$ is 9×10^{-6}. Its molar solubility will be:

- A. 3×10^{-6}
- B. 9×10^{-3}
- C. 3×10^{-3} ✓ **Correct answer**
- D. 9×10^{-6}

A. 3×10^{-6} is not $\sqrt{(9 \times 10^{-6})}$.

B. 9×10^{-3} is not $\sqrt{(9 \times 10^{-6})}$.

C. For AB, $K_{sp} = s^2$, so $s = \sqrt{(9 \times 10^{-6})} = 3 \times 10^{-3}$ mol/dm³.

D. 9×10^{-6} is the K_sp itself, not the solubility. NOTE: corrected 8 Nov 2026 from the faithful Code D reproduction: examoo printed $K_{sp} = 9 \times 10^{-8}$ with $s = 3 \times 10^{-4}$; the reproduction gives $K_{sp} = 9 \times 10^{-6}$ with $s = 3 \times 10^{-3}$ (key C). Renumbered [printed 121] → [printed 126].

Question Q152 (printed 127) Chemistry

Water changes from a liquid at 4°C to ice at 0°C, what is the change in volume?

- A. 9% increase ✓ **Correct answer**
- B. 9% decrease
- C. 19% increase
- D. 19% decrease

A. Water expands by about 9% by volume on freezing (ice Ih is less dense than liquid water, ~0.917 vs ~1.00 g/cm³).

…e increases on freezing, it does not decrease.

C. The expansion is about 9%, not 19%.

D. The volume increases by about 9%, it does not decrease. NOTE: renumbered [printed 122] → [printed 127] 8 Nov 2026 from the faithful Code D reproduction (examoo duplicated this question at #127).

Question Q153 (printed 128) Chemistry

For an exothermic reaction, the energy level of reactant is:

- A. Less than the product
- B. More than the product ✓ **Correct answer**
- C. Equal to the product
- D. Zero

A. In an exothermic reaction energy is released, so the reactants sit higher, not lower, than the products.

B. Energy is released, so the reactants are at a higher energy level than the products; the difference is the heat evolved.

C. The levels differ by the heat evolved; they are not equal.

D. The reactant energy level is not zero.

Question Q154 (printed 124) Chemistry

Real gases DO NOT reach absolute zero in practice because:

- A. Molecular collisions become inelastic due to increased kinetic energy
- B. Intermolecular forces become negligible and molecules disperse
- C. Kinetic energy of molecules increases due to compression
- D. Intermolecular forces exceed kinetic energy of molecules ✓ **Correct answer**

ergy falls on cooling, it does not increase.

B. Intermolecular forces become significant at low temperature, not negligible.

C. Kinetic energy falls on cooling; compression is not the mechanism.

D. As a real gas is cooled, its kinetic energy falls until the intermolecular attractions dominate and the gas liquefies/solidifies before 0 K is reached (Vedantu).

Question Q155 (printed 125) Chemistry

The energy of an orbital is determined by:

- A. Hund's Rule
- B. Pauli-exclusion principle
- C. n+l rule ✓ **Correct answer**
- D. Boyles principle

A. Hund's rule governs filling order within degenerate orbitals; it does not set orbital energy.

B. Pauli's principle governs occupancy limits; it does not set orbital energy.

C. The (n + l) rule orders orbitals by energy (lower n + l = lower energy; ties broken by lower n).

D. Boyle's principle concerns gas pressure and volume, not orbital energy.

Question Q156 (printed 49) Biology

The constant diameter of DNA is maintained by pairing:

- A. Purine towards Pyrimidine ✓ **Correct answer**
- B. Pyrimidine towards Pyrimidine
- C. Purine towards Purine
- D. Sugar towards Phosphate

rick pairing is always purine–pyrimidine (A–T, G–C): a two-ring purine plus a one-ring pyrimidine always spans the same width, keeping the double helix at a constant diameter.

B. Two pyrimidines (one ring each) would be too narrow; the diameter would shrink.

C. Two purines (two rings each) would be too wide; the diameter would bulge.

D. Sugar and phosphate form the backbone, not the base pairing that sets the diameter.

Question Q157 (printed 88) Physics

A boat moves 4 km east and then 3 km north. Another boat moves 3 km north first and then 4 km east. Which statement is CORRECT about their final displacements?

- A. Both boats have the same displacement vector ✓ **Correct answer**
- B. The first boat's displacement is greater because it traveled east first
- C. The second boat's displacement is greater because it travelled north first
- D. Both boats end at different positions but cover the same distance

A. Displacement is path-independent: both boats end at the same point (4 km east, 3 km north of the start), so their displacement vectors are identical (5 km at the same bearing).

B. The order of the legs does not change the endpoint; displacement depends only on start and finish.

C. Travelling north first makes no difference to the final position.

D. Both boats end at the SAME position (and both cover the same 7 km distance); the positions are identical, not different.

Question Q158 (printed 117) Physics

When the area vector A is parallel to the magnetic field B, what is the value of magnetic flux (Φ_B)?

- B. BA cos 0° ✓ **Correct answer**
- C. BA cos 90°
- D. B/A

A. 0 is the flux when the area vector is PERPENDICULAR to the field (θ = 90°), not parallel.

B. Φ_B = BA cos θ; A ∥ B means θ = 0°, so Φ_B = BA cos 0° = BA — the maximum flux.

C. BA cos 90° = 0 is the perpendicular case, not the parallel case.

D. Flux is the product BA cos θ, not the quotient B/A (and the units are wrong).

Question Q159 (printed 120) Chemistry

The force of attraction due to temporary dipoles is:

- A. Dipole-dipole force
- B. Dispersion force ✓ **Correct answer**
- C. Debye force
- D. Ion-dipole force

A. Dipole–dipole forces act between PERMANENT dipoles, not temporary ones.

B. Temporary (instantaneous) dipoles in one molecule induce dipoles in neighbours; the resulting attraction is the London dispersion force.

C. The Debye force acts between a permanent dipole and an INDUCED dipole, not between two temporary dipoles.

D. Ion–dipole forces act between an ion and a polar molecule, not between temporary dipoles.

Question Q160 (printed 121) Chemistry

In which case does a chemical reaction proceed nearly to completion?

- B. When Kc is large but positive ✓ **Correct answer**
- C. When Kc is negative
- D. When Kc is approximately equal to 1

A. A small Kc means the equilibrium lies far to the LEFT; little product forms.

B. Kc = [products]/[reactants]; a large Kc means the equilibrium lies far to the right, so the reaction proceeds nearly to completion.

C. Kc is a ratio of concentrations and can never be negative.

D. Kc ≈ 1 means appreciable amounts of both reactants and products remain at equilibrium; the reaction does not go nearly to completion.

Question Q161 (printed 122) Chemistry

A student adds bromine water to ethene and observes rapid decolourisation. What makes ethene more reactive than ethane in this reaction?

- A. Ethene has a higher molecular mass
- B. Ethene contains a weak and exposed pi bond ✓ **Correct answer**
- C. Ethane contains fewer sigma bonds
- D. Ethene undergoes substitution more readily

A. Ethene (28) actually has a LOWER molecular mass than ethane (30); mass is not the reason.

B. Ethene's C=C double bond has an exposed pi bond (electron-rich, above and below the plane) that bromine attacks readily in electrophilic addition; ethane has only strong sigma bonds.

C. Ethane has MORE sigma bonds (7) than ethene (5); and sigma bonds are strong, not reactive here.

acts by ADDITION across the double bond (bromine adds to both carbons), not substitution.

Question Q162 (printed 123) Chemistry

What best describes the overall reaction in electrophilic aromatic substitution in benzene?

- A. Addition of an electrophile across a double bond
- B. Substitution of a halogen by a nucleophile
- C. Substitution of a proton (H+) by an electrophile on the aromatic ring ✓ **Correct answer**
- D. Substitution of a methyl group by a nucleophile

A. Addition across a double bond would destroy the aromatic ring; benzene preserves aromaticity by substitution, not addition.

B. No halogen is substituted and no nucleophile is involved; the attacking species is an electrophile.

C. An electrophile replaces a ring hydrogen (a proton, H^+) on the benzene ring, restoring aromaticity after the intermediate.

D. Benzene has no methyl group, and the reaction involves an electrophile, not a nucleophile.

Question Q163 (printed 147) Chemistry

Identify the CORRECT electronic configuration for an element with atomic number 24?

- A. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^6$
- B. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^4$
- C. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1\ 3d^5$ ✓ **Correct answer**
- D. $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^0\ 3d^6$

o 4s electrons is the wrong distribution for atomic number 24 (it omits the 4s subshell entirely).

B. [Ar] $4s^2$ $3d^4$ is what the simple filling order predicts, but chromium is the exception: the half-filled $3d^5$ subshell is more stable.

C. Atomic number 24 is chromium, ground state [Ar] $3d^5$ $4s^1$ (half-filled d-subshell exception).

D. $4s^0$ $3d^6$ is not chromium's ground state ($3d^6$ is iron's configuration).

Question Q164 (printed 148) Chemistry

Balance the equation, using the oxidation number method for: $Cu + H_2SO_4 \rightarrow CuSO_4 + SO_2 + H_2O$

- A. $Cu + H_2SO_4 \rightarrow CuSO_4 + SO_2 + H_2O$
- B. $Cu + H_2SO_4 \rightarrow CuSO_4 + SO_2 + H_2O$
- C. $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$ ✓ **Correct answer**
- D. $2Cu + 2H_2SO_4 \rightarrow 2CuSO_4 + SO_2 + 2H_2O$

A. Unbalanced: LHS has S 1, O 4; RHS has S 2, O 7.

B. As printed it reads the same unbalanced form as A (S 1 vs 2, O 4 vs 7).

C. LHS Cu 1, H 4, S 2, O 8; RHS $CuSO_4$ (Cu 1, S 1, O 4) + SO_2 (S 1, O 2) + $2H_2O$ (H 4, O 2) = Cu 1, S 2, H 4, O 8. Balanced.

D. Unbalanced: LHS S 2, O 8; RHS $2CuSO_4 + SO_2$ gives S 3, O 12. NOTE: options A and B print identically in the reproduction (the distinguishing coefficients/subscripts may differ in the original figure); the answer C follows by atom balance regardless.

Question Q165 (printed 149) Chemistry

The compound that reacts with phenyl hydrazine to form a crystalline phenyl hydrazone

- A. Butanal ✓ **Correct answer**
- B. 1,3-butadiene
- C. Ethyl acetate
- D. Ethanol

A. Phenylhydrazine condenses with the carbonyl group of aldehydes (and ketones) to give crystalline phenylhydrazones; butanal is the only aldehyde offered.

B. 1,3-butadiene has no carbonyl group (only C=C bonds), so it cannot form a phenylhydrazone.

C. Ethyl acetate is an ester; esters do not condense with phenylhydrazine to give phenylhydrazones.

D. Ethanol is an alcohol with no carbonyl group.

Question Q166 (printed 150) Chemistry

If 4 g of H_2 reacts with 2 moles of O_2 to form water, which one is the excess reagent?

- A. H_2 only
- B. O_2 only ✓ **Correct answer**
- C. H_2O only
- D. Both O_2 and H_2

A. 4 g H_2 = 2 mol H_2, and the reaction $2H_2 + O_2 \rightarrow 2H_2O$ consumes all of it; H_2 is the limiting reagent, not in excess.

B. 2 mol H_2 needs only 1 mol O_2, but 2 mol O_2 is present, so O_2 is in excess (1 mol left over).

C. H_2O is the product, not a reagent.

D. Only O_2 is in excess; H_2 is fully consumed.

Q167 (printed 151) Chemistry

If 10 moles of magnesium react with excess of oxygen. Calculate the theoretical yield of magnesium oxide (MgO). (Molar mass of Magnesium = 24 g/mol, Oxygen = 16 g/mol)

- A. 160 g
- B. 240 g
- C. 320 g
- D. 400 g ✓ **Correct answer**

A. 160 g would be 10 mol of oxygen atoms (10 × 16), not of MgO.

B. 240 g is the mass of 10 mol of magnesium alone (10 × 24), not of the oxide.

C. 320 g has no step in the calculation giving it (it would be 8 mol of MgO).

D. $2Mg + O_2 \rightarrow 2MgO$; 10 mol Mg → 10 mol MgO; M(MgO) = 24 + 16 = 40 g/mol; 10 × 40 = 400 g.

Question Q168 (printed 152) Chemistry

Acetaldehyde reacts with ethanol in presence of acid and initially produces:

- A. Acetal
- B. Hemiacetal ✓ **Correct answer**
- C. Diol
- D. Diethoxyethane

A. The full acetal forms only after reaction with a SECOND alcohol molecule, not initially.

B. Acid-catalysed addition of one alcohol molecule to the aldehyde gives the hemiacetal first.

C. A diol has two –OH groups on the same molecule; this reaction adds one alcohol to the carbonyl carbon.

D. Diethoxyethane (the full acetal, $CH_3CH(OCH_2CH_3)_2$) is the final product after two alcohol

act, not the initial product.

Question Q169 (printed 154) Chemistry

Consider the given reaction: $2Na + Cl_2 \rightarrow 2NaCl$. If 4 moles of Na and 2 moles of Cl_2 are reacted, how much Cl_2 will remain unreacted?

- A. 0 mol ✓ **Correct answer**
- B. 0.5 mol
- C. 1 mol
- D. 1.5 mol

A. The stoichiometric ratio is 2 mol Na : 1 mol Cl_2; 4 mol Na needs exactly 2 mol Cl_2, so none remains.

B. 0.5 mol left would mean only 1.5 mol Cl_2 reacted, needing only 3 mol Na.

C. 1 mol left would mean only 1 mol Cl_2 reacted, needing only 2 mol Na.

D. 1.5 mol left would mean only 0.5 mol Cl_2 reacted, needing only 1 mol Na.

Question Q170 (printed 155) Chemistry

The electronic configuration of Fe^{3+} (Z = 26) is:

- A. [Ar] $4s^2$, $3d^3$
- B. [Ar] $4s^1$, $3d^4$
- C. [Ar] $4s^0$, $3d^5$ ✓ **Correct answer**
- D. [Ar] $4s^0$, $3d^6$

A. [Ar] $4s^2$ $3d^3$ has 23 electrons but the wrong distribution (iron loses its 4s electrons first on ionisation).

B. $4s^1$ $3d^4$ is 23 electrons but not the ground state of Fe^{3+}.

C. Fe = [Ar] $4s^2$ $3d^6$; Fe^{3+} loses the two 4s electrons first and then one 3d electron → [Ar] $3d^5$

D. [Ar] $4s^0$ $3d^6$ is 24 electrons — that is Fe^{2+}'s configuration, not Fe^{3+}'s.

Question Q171 (printed 157) Chemistry

IUPAC name of CH_3-CH_2-CH_2-C≡CH is?

- A. hex-1-yne
- B. pent-2-yne
- C. pent-4-yne
- D. pent-1-yne ✓ **Correct answer**

A. The chain has five carbons, not six (hex- would need six).

B. The triple bond is at C1 (numbered from the ≡CH end), not C2.

C. Numbering must give the triple bond the lowest locant; pent-4-yne numbers from the wrong end (it would be pent-1-yne).

D. Five carbons with the triple bond at C1: pent-1-yne.

Question Q172 (printed 158) Chemistry

According to Le Chatelier's Principle, when the pressure of a gaseous equilibrium system is increased, the equilibrium shifts towards:

- A. No change in equilibrium position
- B. The side with greater volume
- C. The side with lower volume ✓ **Correct answer**
- D. The side with more moles of gas

A. Changing the pressure does shift the equilibrium (unless both sides have equal moles of gas).

B. Higher pressure favours the side with FEWER gas moles (lower volume), not greater.

pressure favours the side with fewer gas moles (lower volume), relieving the pressure.

D. More moles of gas means greater volume; pressure favours the opposite side.

Question Q173 (printed 159) Chemistry

Consider a reaction $2A + B_2 \rightarrow 2AB$. Which of the following mixtures would make A the limiting reagent?

- A. 300 atoms of A and 400 molecules of B_2 ✓ **Correct answer**
- B. 100 atoms of A and 50 molecules of B_2
- C. 2 mol of A and 1 mol of B_2
- D. 5 mol of A and 2.5 mol of B_2

A. The reaction needs A:B_2 = 2:1; 400 B_2 would need 800 A but only 300 are present, so A limits.

B. 100 A : 50 B_2 is exactly 2:1, stoichiometric; neither reagent limits.

C. 2 mol A : 1 mol B_2 is exactly stoichiometric.

D. 5 mol A : 2.5 mol B_2 is exactly 2:1, stoichiometric. NOTE: the reproduction prints B_2 (diatomic) throughout — the stem and options are corrected to the reproduction's notation 8 Nov 2026; the answer is unchanged (the addendum had normalised it to B).

Question Q174 (printed 160) Chemistry

On increasing the temperature, the rate of reaction increases mainly because:

- A. The activation energy of the reaction increases
- B. The concentration of the reacting molecules increases
- C. The collision frequency increases ✓ **Correct answer**
- D. The energy of molecules decreases

A. Activation energy is a property of the reaction; temperature does not raise it.

ıtion does not rise with temperature (for a fixed amount in a fixed volume).

C. The intended answer on the textbook reading: more frequent (and more energetic) collisions.

D. Molecular energy RISES with temperature, it does not decrease. Caveat: strictly, the dominant factor is the increased FRACTION of molecules with energy ≥ Ea (Boltzmann factor), not the modest rise in collision frequency — but no option states that, and the textbook-simplification reading (C) is the intended answer.

Question Q175 (printed 161) Chemistry

Heat of sublimation of Na = 108 kJ/mol, Ionization energy of Na = 496 kJ/mol, Bond dissociation energy of Cl_2 = 121 kJ/mol, Electron affinity of Cl = −349 kJ/mol, and Enthalpy of formation of NaCl = −411 kJ/mol. Calculate the lattice energy of NaCl:

- A. −678 kJ/mol
- B. −727 kJ/mol ✓ **Correct answer**
- C. −819 kJ/mol
- D. −832 kJ/mol

A. −678 kJ/mol does not follow from the Born–Haber cycle with the given data.

B. ΔHf = ΔHsub + IE + ½BDE + EA + U, so U = −411 − 108 − 496 − 60.5 − (−349) = −726.5 ≈ −727 kJ/mol.

C. −819 kJ/mol does not follow from the cycle.

D. −832 kJ/mol does not follow from the cycle.

Question Q176 (printed 162) Chemistry

The molecular orbitals in benzene are:

- A. Localized
- B. Delocalized ✓ **Correct answer**

ridized

- D. Polarized

A. Localized orbitals belong to single bonds; benzene's pi system is not localized.

B. Benzene's six π electrons occupy delocalized molecular orbitals spread over the whole ring (the basis of aromaticity).

C. Hybridization describes atomic orbitals mixing (sp^2 in benzene's carbons), not the molecular orbitals themselves.

D. Polarization is about charge separation in a bond, not the nature of benzene's pi orbitals.

Question Q177 (printed 89) — Excluded (defective)

The area under the line on a displacement-time graph of a car moving with uniform velocity would be a:

- A. Rectangle
- B. Triangle
- C. Trapezium
- D. Parallelogram

No answer is given for this question, and none is taught. The premise is defective in itself: the area under a displacement–time graph is not a standard physical quantity — velocity is the SLOPE of a displacement–time graph, and the area is meaningful under a VELOCITY–time graph (where it is displacement). The stem does not state the starting displacement, so Triangle (key B, from-origin reading) and Trapezium (general reading) are both defensible and no single answer can be asserted. Stem and option set read visually from the rendered Code D reproduction page, 8 Nov 2026. Decided by assistant under the owner's 8 Nov 2026 delegation. This question must never be taught as having a single answer.

A. A rectangle is the area under a horizontal line (a constant value); a displacement–time

rm velocity slopes, so it is not a rectangle.

B. The official key (Code D 89 = B, two agreeing copies) records Triangle — the area under a straight sloping line that starts at the origin (zero displacement at t = 0). But the stem does not state the starting displacement.

C. In general the area beneath a straight sloping line down to the time axis is a trapezium; that is the geometric reading when the line does not start at the origin.

D. A parallelogram has two pairs of parallel sides; the area under a single sloping line is not a parallelogram. DEFECTIVE-excluded — decided by assistant under the owner's 8 Nov 2026 delegation. The premise is defective in itself: the area under a displacement–time graph is not a standard physical quantity — velocity is the SLOPE of a displacement–time graph, and the area is meaningful under a VELOCITY–time graph (where it is displacement). The stem does not state the starting displacement, so Triangle (key B, from-origin reading) and Trapezium (general reading) are both defensible and no single answer can be asserted. The stem and option set were read visually from the rendered Code D reproduction page (8 Nov 2026). This question must never be taught as having a single answer.

Question Q178 (printed 98) Physics

A wheel of radius 0.4 m has an angular acceleration of 6 rad/s². The linear acceleration is:

- A. 1.2 m/s²
- B. 1.2 m/s
- C. 2.4 m/s
- D. 2.4 m/s² ✓ **Correct answer**

A. 1.2 is the wrong value: a = rα = 0.4 × 6 = 2.4, not 1.2.

B. Wrong value and wrong units: acceleration is measured in m/s², not m/s.

C. The value 2.4 is right but the units are wrong: m/s is a velocity, not an acceleration.

4 m × 6 rad/s² = 2.4 m/s², correct. NOTE: the batch addendum flagged this question defective on the examoo extraction, which showed C and D both as "2.4 m/s²"; the faithful Code D reproduction distinguishes them by units (C is 2.4 m/s, D is 2.4 m/s²), read visually from its rendered page 8 Nov 2026, so D is uniquely correct. The official key (Code D 98 = D, two agreeing copies) agrees.

Note: The batch addendum flagged this question defective on the examoo extraction, which showed C and D both as '2.4 m/s²'; the faithful Code D reproduction distinguishes them by units (C is 2.4 m/s, D is 2.4 m/s²), read visually from its rendered page 8 Nov 2026, so D is uniquely correct. The official key (Code D 98 = D, two agreeing copies) agrees.

Question Q179 (printed 153) — Excluded (defective)

IUPAC name of given compound $Br\text{-}CH_2\text{-}CH_2\text{-}CO\text{-}CH_3$ is?

- A. 1-bromobutan-1-one
- B. 1-bromobutan-2-one
- C. 1-bromobutan-3-one
- D. 1-bromobutan-4-one

No answer is given for this question, and none is taught. Correct IUPAC numbering of the printed structure Br-CH2-CH2-CO-CH3 gives the ketone the lowest locant: CH3-C(=O)-CH2-CH2Br = 4-bromobutan-2-one, which is NOT among the options; the key's B (1-bromobutan-2-one) names Br-CH2-CO-CH2-CH3, a different compound, and matches neither the correct name nor the naive numbering (C, 1-bromobutan-3-one). Structure and option set read visually from the rendered Code D reproduction page, 8 Nov 2026 — not an extraction error. Decided by assistant under the owner's 8 Nov 2026 delegation. This question must never be taught as having a single answer.

A. Numbering the ketone carbon as C1 is wrong: the carbonyl carbon takes the lowest locant, and a ketone cannot sit at C1 of a butane chain in this naming.

B. The official key (Code D 153 = B, two agreeing copies) records B, but B names $Br\text{-}CH_2\text{-}CO\text{-}CH_2\text{-}CH_3$, a different compound from the printed $Br\text{-}CH_2\text{-}CH_2\text{-}CO\text{-}CH_3$.

to-right numbering from the bromine end gives 1-bromobutan-3-one, but IUPAC numbering gives the ketone the lowest locant, not the bromine.

D. Numbering from the bromine end with the ketone at C4 contradicts the lowest-locant rule for the principal group. DEFECTIVE-excluded — decided by assistant under the owner's 8 Nov 2026 delegation. Correct IUPAC numbering of the printed structure Br-CH_2-CH_2-CO-CH_3 gives the ketone the lowest locant: CH_3-C(=O)-CH_2-CH_2Br = 4-bromobutan-2-one, which is NOT among the options; the key's B matches neither that reading nor the naive numbering (C). The structure and option set were read visually from the rendered Code D reproduction page (8 Nov 2026), so this is not an extraction error. This question must never be taught as having a single answer.

Question Q180 (printed 156) — Excluded (defective)

If pressure and temperature of a gas are doubled, the new volume will be:

- A. Doubled
- B. Halved
- C. Tripled
- D. Four times

No answer is given for this question, and none is taught. For a fixed amount of ideal gas V ∝ T/P; doubling both T and P leaves V UNCHANGED, and 'unchanged' is not among the options. The key's D (Four times) contradicts the ideal-gas law as printed. Stem and option set read visually from the rendered Code D reproduction page, 8 Nov 2026. Decided by assistant under the owner's 8 Nov 2026 delegation. This question must never be taught as having a single answer.

A. Doubling both T and P leaves V unchanged (V ∝ T/P), not doubled.

B. Halving would follow from doubling P alone at constant T; T is doubled too.

C. No combination of doubling T and P gives a threefold volume.

D. The official key (Code D 156 = D, two agreeing copies) records D, but V ∝ T/P gives

P, so the volume is unchanged — four times contradicts the ideal-gas law as printed. DEFECTIVE-excluded — decided by assistant under the owner's 8 Nov 2026 delegation. For a fixed amount of ideal gas V ∝ T/P; doubling both T and P leaves V UNCHANGED, and "unchanged" is not among the options. The stem and option set were read visually from the rendered Code D reproduction page (8 Nov 2026). This question must never be taught as having a single answer.

This paper remains the paper of Khyber Medical University (KMU), Khyber Pakhtunkhwa. Ranjha Solutions branding is on this solved presentation only — the paper is not owned by Ranjha Solutions.

Past papers are **free** — no charge is taken from any student for papers. Answers are as of the 2025 sitting.

Source: https://mdcatpapers.com/past-papers/2025/kmu-d (accessed 31 Oct 2026); second source (faithful Code D reproduction, re-typeset — not the KMU portal original): https://educationinkarachi.net/wp-content/uploads/2026/09/KMU-MDCAT-2025-Code-D-Branded.pdf; the KMU portal serves the 2026 key only — the 2025 official key is no longer served there; the reproduction's key table agrees with the taleem360 key sheet on all 180 letters. See the source note on this page about the excluded questions and the numbering.