UHS MDCAT 2023 — Solved Past Paper

Body: University of Health Sciences (UHS), Lahore · **Post:** MDCAT (Medical & Dental College Admission Test), Punjab · **Year:** 2023 · **Questions:** 200 in the original paper — **181 solved and verified**, 19 excluded as defective (4 defective questions + 15 missing, unrecoverable) · **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 2023 sitting.

Source note: Primary source: mdcatpapers.com transcription of UHS MDCAT 2023 (accessed 31 Oct 2026), transcribed word for word, 185 questions in transcription order Q1-Q185; printed numbers preserved inside the stems where the page prints them (48 stems). The original paper held 200 MCQs (confirmed 8 Nov 2026: Scribd 'UHS MDCAT 2023 Answer Key PDF' states 4 codes x 200 questions; LearnoSpot UHS MDCAT 2023 bank numbered 1/200; Pakiology 200-MCQ pattern). 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): Q52 (overlapping lobule ranges), Q79 (covalent/network solids also 'atomic solids'), Q96 (no complex is tetrahedral), Q174 (printed 179; no true antonym of 'abandonment') — see the excluded list. 15 questions are missing from the transcription and excluded as unrecoverable (bounded by interval: 3 in printed 1-80, 1 in printed 100-114, 1 in printed 116-118, 10 in printed 188-200); a second bank (LearnoSpot) was examined 8 Nov 2026 and rejected as a fill source (re-sorted, duplicate stems, no keys). 9 SINGLE-SOURCE items were promoted to VERIFIED from the wave-16, wave-17 and sprint (5 Nov) addenda (Q22, Q23, Q46, Q49, Q74, Q106, Q110, Q160, Q175). Q123 and Q142 already carry the corrected keys (D and B (U/4)) as VERIFIED — the printed keys A were wrong in both cases. Numbering follows the file: transcription order Q1-Q185, printed numbers shown where the stem carries one; do NOT renumber.

Q1 Biology

What does the term bacteriophage refer to?

- A. A virus that infects bacteria ✓ **Correct answer**
- B. A bacterium that infects virus
- C. A virus which behaves as bacteria
- D. Combination of Bacterium & Virion

A. "Bacteriophage" = bacteria-eater: a virus that infects bacterial cells; correct.

B. Reverses the relationship; bacteria do not infect viruses.

C. Viruses do not behave as bacteria (no metabolism, no independent growth).

D. A meaningless combination; a phage is a virus particle, not a hybrid.

Question Q2 Biology

What of the following virus contains single stranded DNA?

- A. Adeno virus
- B. Herpes virus
- C. Parvo virus ✓ **Correct answer**
- D. Pox virus

A. Double-stranded DNA virus.

B. Double-stranded DNA virus.

C. Small single-stranded DNA virus; correct.

D. Large double-stranded DNA virus.

Question Q3 Biology

How may tail fibrils are attached to the end plate of a bacteriophage?

- B. 4
- C. 6 ✓ **Correct answer**
- D. 8

A. Too few for the classic T4 baseplate.

B. Not the standard count.

C. Tailed phages such as T4 carry six long tail fibres on the baseplate; correct.

D. Too many. (Stem prints "How may" for "How many", and "end plate" for baseplate.)

Question Q4 Biology

The enzymes integrase, protease and reverse transcriptase are found in which virus?

- A. Hepatitis A virus
- B. Herpes virus
- C. Influenza virus
- D. Human immunodeficiency virus ✓ **Correct answer**

A. A picornavirus; it has a protease but no reverse transcriptase/integrase set.

B. A DNA virus; no reverse transcriptase.

C. An RNA virus with an RNA polymerase, not this enzyme trio.

D. A retrovirus carrying reverse transcriptase, integrase and protease in the virion; correct.

Question Q5 Biology

What is the end product of glucose by yeast in anaerobic respiration?

- A. Ethanol and oxygen
- B. Ethanol and water

anol and CO2 ✓ **Correct answer**

- D. Lactic acid and CO2

A. Oxygen is not a product of anaerobic fermentation.

B. Water is not the co-product here.

C. Alcoholic fermentation: glucose → 2 ethanol + 2 CO_2; correct.

D. Lactic-acid fermentation (muscle, Lactobacillus) gives lactate, not ethanol.

Question Q6 Biology

Each carrier in Electron Transport Chain is first _____ and then _____.

- A. Broken-down, Regenerate
- B. Generated, Broken-down
- C. Oxidized, Reduced
- D. Reduced, Oxidized ✓ **Correct answer**

A. Carriers are not broken down and regenerated; they cycle.

B. Carriers are reused, not generated and destroyed.

C. Reverses the sequence: a carrier must first ACCEPT electrons.

D. Each carrier is reduced (gains electrons) then oxidised (passes them on); correct.

Question Q7 Biology

Electron transport chain explains:

- A. Photophosphorylation
- B. Z-Scheme
- C. Photolysis
- D. Mechanism of ATP synthesis ✓ **Correct answer**

esis in photosynthesis specifically; the ETC is the broader mechanism.

B. The photosynthetic electron-flow model, a specific case.

C. Splitting of water in photosynthesis, a specific step.

D. The ETC builds the proton gradient that drives ATP synthase (oxidative phosphorylation); the intended general answer; correct.

Question Q8 Biology

What is the colour of Chlorophyll-b molecule?

- A. Blueish green
- B. Yellowish green ✓ **Correct answer**
- C. Dark Green
- D. Reddish green

A. That is chlorophyll-a's colour.

B. Chlorophyll-b absorbs blue/red-orange and appears yellow-green; correct.

C. A description of leaf colour overall, not chlorophyll-b.

D. Not a chlorophyll colour.

Question Q9 Biology

Upon initial hydrolysis starch yields:

- A. Maltose ✓ **Correct answer**
- B. Glucose
- C. Sucrose
- D. Mannose

A. Amylase cleaves starch to maltose (a glucose disaccharide) first; correct.

only after further hydrolysis of maltose by maltase.

C. A glucose–fructose disaccharide, not a starch product.

D. A different monosaccharide, not from starch.

Question Q10 Biology

Human Bone cells contain. .....% of water?

- A. 20 ✓ **Correct answer**
- B. 40
- C. 85
- D. 90

A. Bone is a mineralised tissue with low water content, ≈20%; correct.

B. Too high for bone.

C. Typical of soft, watery tissues (e.g. brain/kidney range), not bone.

D. Near blood-plasma levels; far too high for bone.

Question Q11 Biology

Unique three-dimensional shape of the fully folded polypeptide, constitutes:

- A. Primary structure of protein
- B. Secondary structure of protein
- C. Tertiary structure of protein ✓ **Correct answer**
- D. Quaternary structure of protein

A. The amino-acid sequence.

B. Local folding (α-helix, β-sheet).

C. The unique 3-D folding of ONE polypeptide chain; correct.

of MULTIPLE polypeptide subunits.

Question Q12 Biology

Butyric acid is a _____ carbon fatty acid.

- A. 6
- B. 2
- C. 4 ✓ **Correct answer**
- D. 8

A. That is caproic (hexanoic) acid.

B. That is acetic acid.

C. Butanoic (butyric) acid has a 4-carbon chain; correct.

D. That is caprylic (octanoic) acid.

Question Q13 Biology

Which of the following is a conjugated molecule?

- A. Protein
- B. Lipid
- C. Glycoproteins ✓ **Correct answer**
- D. Vitamins

A. A plain (simple) protein has no prosthetic group attached.

B. A simple lipid is not a conjugated molecule in this sense.

C. Proteins conjugated (covalently linked) to carbohydrate chains; correct.

D. A functional category of diverse molecules, not a conjugated-molecule class.

Q14 Biology

Hydrolysis process is a reverse of ---------- process.

- A. Photolysis
- B. Condensation ✓ **Correct answer**
- C. Deduction
- D. Convection

A. Splitting by light; unrelated.

B. Dehydration synthesis removes water to form a bond; hydrolysis adds water to break it — exact reverse; correct.

C. A reasoning term, not a chemical process.

D. Heat transfer by fluid movement; unrelated.

Question Q15 Biology

Proteins are the main ---------- of the cell?

- A. Physiological components
- B. Functional components ✓ **Correct answer**
- C. Structural components
- D. Biological components

A. A vague phrase; not the textbook term.

B. Proteins carry out most cellular functions (enzymes, transporters, receptors); the keyed term; correct.

C. Proteins do have structural roles, but the paper's intended emphasis is functional.

D. Too vague to be the answer.

Q16 Biology

Structure formed by invagination of plasma membrane and involved in cell division and DNA replication of prokaryotic cell:

- A. Lysosomes
- B. Mesosomes ✓ **Correct answer**
- C. Golgi bodies
- D. Phragmoplasts

A. Eukaryotic digestive organelles, not prokaryotic membrane folds.

B. Infoldings of the prokaryotic plasma membrane, classically associated with DNA replication/division; correct as the textbook answer (modern work questions their existence as artefacts, but this is the paper's intended fact).

C. Eukaryotic organelles, absent from prokaryotes.

D. Plant-cell structures for cytokinesis, not prokaryotic.

Question Q17 Biology

Which of the following are single membranous organelles?

- A. Mitochondria and ribosomes
- B. Cytosol, mitochondria and ribosomes
- C. Golgi bodies, Lysosome and ER ✓ **Correct answer**
- D. Golgi bodies, lysosome and mitochondria

A. Mitochondria are DOUBLE-membraned; ribosomes have NO membrane.

B. Cytosol is not an organelle; mitochondria double-membraned; ribosomes unbound.

C. All bounded by a SINGLE membrane; correct.

D. Spoiled by the double-membraned mitochondrion.

Q18 Biology

Movement of molecules against the concentration gradient is?

- A. Passive transport
- B. Active transport ✓ **Correct answer**
- C. Facilitated diffusion
- D. Filtration

A. Down the gradient, no energy.

B. Against the gradient, requiring ATP; correct.

C. Down the gradient via proteins, no energy.

D. Movement driven by pressure, not against a gradient by transport.

Question Q19 Biology

The digestive vacuoles and autophagosomes are also known as?

- A. Phagocytosis
- B. Primary lysosome and autophagy
- C. Secondary lysosome ✓ **Correct answer**
- D. Peroxisome

A. The PROCESS of engulfing, not the vacuole's name.

B. Primary lysosomes are the enzyme vesicles BEFORE fusion; autophagy is the process.

C. A lysosome fused with a phagosome/autophagosome, actively digesting; correct.

D. An oxidative organelle, unrelated.

Question Q20 Biology

The cell wall of Bacteria is made up of:

- B. Murein ✓ **Correct answer**
- C. Cellulose
- D. Hemicellulose

A. Fungal walls and arthropod exoskeletons.

B. Peptidoglycan, the bacterial wall polymer; correct.

C. Plant walls.

D. Plant walls.

Question Q21 Biology

Which one is common in both prokaryotic and eukaryotic cells?

- A. Cytoplasmic streaming movement
- B. Ribosome ✓ **Correct answer**
- C. Binary fission
- D. Nuclear envelope

A. A eukaryotic phenomenon.

B. Protein synthesis machinery in both (70S in prokaryotes, 80S in eukaryotes); correct.

C. Prokaryotic division mode.

D. Eukaryotes only; prokaryotes have no nucleus.

Question Q22 Biology

There is no clear difference between dendrites and axons in sensory neurons, except:

- A. Thickness
- B. Length ✓ **Correct answer**
- C. Terminal portions

A. Sensory processes are similar in calibre; not the distinguishing feature cited.

B. The keyed distinction: in pseudounipolar sensory neurons the axonal process is much longer than the dendritic one. Flagged: this is a textbook simplification; functionally the processes differ in direction of impulse flow, which the stem excludes by its framing. VERIFIED (Wave-17 addendum, 2 Nov 2026): BYU neuron-structure reading (the axon can extend for more than a metre, in contrast to the shorter dendrites) + Embibe pseudounipolar neuron (the longer peripheral process, the relatively shorter central process). Caveat retained: strictly a pseudounipolar sensory neuron has no true dendrites — "dendrite" here means the peripheral process.

C. Terminals differ in target, but the stem's cited distinction is length.

D. Would deny the length distinction the paper asserts.

Question Q23 Biology

The neurotransmitter active outside the CNS (Central Nervous System) is:

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

A. The keyed answer: the transmitter at neuromuscular junctions and in the peripheral/autonomic nervous system.

B. Mainly central, but also peripheral (it is used peripherally too).

C. Mainly central excitatory transmitter.

D. Mainly central, but also abundant in the gut (peripheral). Flagged: the stem's premise is loose — dopamine and serotonin also act outside the CNS — so acetylcholine is the

est" answer, not an exclusive fact. VERIFIED (Wave-17 addendum, 2 Nov 2026): Cleveland Clinic (acetylcholine released into the neuromuscular junction and a major transmitter of the autonomic nervous system) + UT Neuroscience Online (acetylcholine at all autonomic ganglia, at many autonomically innervated organs, at the neuromuscular junction). Caveat retained: dopamine, glutamate and serotonin also occur outside the brain in other roles; acetylcholine is the defining peripheral transmitter the stem asks for.

Question Q24 Biology

A hormone that plays a major role in social bonding, childbirth, milk ejection and sexual reproduction is:

- A. Estrogen
- B. Oxytocin ✓ **Correct answer**
- C. Prolactin
- D. Secretin

A. Female sex-hormone development/fertility, not the bonding/milk-ejection hormone named.

B. Uterine contractions, milk ejection, pair/social bonding; correct.

C. Milk PRODUCTION (synthesis), not ejection/bonding.

D. A gut hormone; unrelated.

Question Q25 Biology

Hormone produced by placenta is:

- A. Follicle-Stimulating Hormone (FSH)
- B. Luteinizing Hormone (LH)
- C. Progesterone ✓ **Correct answer**
- D. Testosterone

gonadotropin.

B. Pituitary gonadotropin.

C. Synthesised by the placenta (and corpus luteum) to maintain pregnancy; correct. (The placenta also makes hCG and oestrogens, but progesterone is the listed placental product.)

D. Made mainly by the testes.

Question Q26 Biology

The middle layer of meninges is:

- A. Arachnoid mater ✓ **Correct answer**
- B. Pia mater
- C. Dura mater
- D. Cranium

A. Outer dura, middle arachnoid, inner pia; correct.

B. The innermost layer, on the brain surface.

C. The outermost layer.

D. The skull bone, not a meningeal layer.

Question Q27 Biology

The part of brain which guides smooth and accurate motions and maintains body position is:

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

ought, voluntary initiation, not fine coordination itself.

B. Coordinates smooth, accurate movement, balance and posture; correct.

C. Brainstem relay.

D. Brainstem control of heartbeat/breathing.

Question Q28 Biology

Water vascular system or ambulacral system is a unique and complex system specially present in?

- A. Sponges
- B. Arthropods
- C. Echinoderms ✓ **Correct answer**
- D. Fishes

A. Have a canal system for water flow, not a water-vascular system.

B. Have open circulation and tracheae; no ambulacral system.

C. Sea stars/urchins: tube feet driven by the water-vascular system; correct.

D. Vertebrates with closed circulation; no such system.

Question Q29 Biology

Round worms belong to which phylum?

- A. Annelida
- B. Coelenterata
- C. Nematoda ✓ **Correct answer**
- D. Platyhelminthes

A. Segmented worms (earthworm, leech).

orals.

C. Roundworms; correct.

D. Flatworms.

Question Q30 Biology

Silver fish is a/an?

- A. Insect ✓ **Correct answer**
- B. Mollusc
- C. Jawless fish
- D. Cartilaginous fish

A. Silverfish (Lepisma) is a primitive wingless insect; correct despite its name.

B. Snails etc.; silverfish is not one.

C. Lampreys/hagfish; not an insect.

D. Sharks/rays; not an insect.

Question Q31 Biology

Tissue are not found in the following animal?

- A. Flat worms
- B. Sponges ✓ **Correct answer**
- C. Cnidarians
- D. Round worms

A. Have organised tissues (though no true organs in some).

B. Cellular level of organisation; no true tissues; correct.

C. Have tissue-level organisation (two tissue layers).

ies and organ systems.

Question Q32 Biology

Enzymes lower the activation energy by stabilizing the transition state of a metabolic reaction due to?

- A. Changing conditions within the active site ✓ **Correct answer**
- B. Changing conditions within the protein framework
- C. Rearranging the fatty acids in active site
- D. Distorting the molecules in the allosteric site

A. The active site provides a microenvironment (charge, pH, orientation) that stabilises the transition state; correct.

B. Too general: the catalytic effect is localised to the active site.

C. No fatty acids are involved in the active site.

D. Allosteric sites regulate; they do not stabilise the transition state at the active site.

Question Q33 Biology

Competitive inhibitors compete with?

- A. Enzyme
- B. Substrate ✓ **Correct answer**
- C. Product
- D. Coenzyme

A. The inhibitor BINDS the enzyme; it competes WITH the substrate FOR the enzyme.

B. For the active site; correct.

C. Products do not compete for the active site in this sense.

D. A helper molecule; not the competitor.

Q34 Biology

Non-competitive inhibitor molecules have:

- A. A similar structure to the normal substrate molecule
- B. A quite different structure from the substrate molecule ✓ **Correct answer**
- C. A different conformation but fit into the active site
- D. A similar conformation but does not fit into the active site

A. That describes COMPETITIVE inhibitors.

B. Non-competitive inhibitors bind elsewhere and need not resemble the substrate; correct.

C. Fitting the active site is competitive behaviour.

D. Self-contradictory as a description.

Question Q35 Biology

Zinc ion is attached at the active site of the enzyme carboxypeptidase. The zinc ion functions as

- A. A coenzyme molecule
- B. An activator ✓ **Correct answer**
- C. An inhibitor molecule
- D. Controller of Allosteric site

A. Coenzymes are ORGANIC molecules (e.g. NAD^+); Zn^{2+} is inorganic.

B. A metal-ion cofactor/activator required for catalysis at the active site; correct.

C. Zinc enables, not inhibits, carboxypeptidase.

D. Zinc sits AT the active site, not at a separate allosteric site.

Q36 Biology

What is the best physiological pH for optimum functioning for most of the cellular enzymes of human?

- A. 2-3 pH
- B. 3-5 pH
- C. 6-8 pH ✓ **Correct answer**
- D. 8-10 pH

A. Stomach acidity; only pepsin-type enzymes work there.

B. Acidic; most cytosolic enzymes would denature or slow.

C. Around neutrality (≈7.4 intracellular), the optimum for most human enzymes; correct.

D. Alkaline; most enzymes lose activity.

Question Q37 Biology

Adaptations that an organism acquires by its own actions during its life span without modifying its genome are:

- A. Heritable
- B. Non-heritable ✓ **Correct answer**
- C. Can be made heritable through some modification
- D. Sometimes heritable and other times non-heritable

A. Requires a genome change passed to offspring.

B. Acquired characters (e.g. a scar, a trained muscle) are not inherited; correct (Lamarckian inheritance is rejected).

C. No mechanism in the paper's framing makes an acquired character heritable.

D. No: without a genome change, never heritable.

Q38 Biology

For evolutionary process to occur, which of the following is NOT a geographical barrier?

- A. Ocean
- B. River
- C. Mountains
- D. Atmosphere ✓ **Correct answer**

A. Separates populations (island/mainland).

B. Separates terrestrial populations.

C. Separate populations by altitude/climate.

D. The air itself is not a geographic barrier separating populations in the sense meant; correct as the exception (birds/flying insects cross it freely, and it surrounds all populations).

Question Q39 Biology

According to the Biogenetic Law of Ernst Haeckel:

- A. There is survival of the fittest
- B. There is use and disuse of organs
- C. Phylogeny recapitulates ontogeny
- D. Ontogeny recapitulates phylogeny ✓ **Correct answer**

A. Spencer/Darwin's phrase, not Haeckel.

B. Lamarck.

C. Reverses Haeckel's formula.

D. Haeckel's law as traditionally stated: development repeats evolutionary history; correct. (Modern biology regards the law as an oversimplification; the answer is the historical formula.)

Q40 Biology

The animal species on Galapagos resemble species living on the:

- A. Northern Europe
- B. Great Britain
- C. North American mainland
- D. South American mainland ✓ **Correct answer**

A. Biogeographically distant; no resemblance.

B. Likewise distant.

C. Farther than South America and not the source fauna Darwin noted.

D. The nearby mainland whose fauna colonised the Galápagos and diverged; correct.

Question Q41 Biology

Digested food from intestine is carried to the liver by?

- A. Hepatic artery
- B. Hepatic vein
- C. Hepatic portal vein ✓ **Correct answer**
- D. Hepatic portal artery

A. Brings oxygenated blood TO the liver, not digested food from the gut.

B. Carries blood AWAY from the liver to the vena cava.

C. Drains the intestine to the liver with absorbed nutrients; correct.

D. No such vessel exists.

Question Q42 Biology

---------- proteins are produced by WBCs in response to -------- and provide immunity?

biotics, antigen

- B. Antibodies, RBC
- C. Globulin, histamine
- D. Antibodies, antigen ✓ **Correct answer**

A. Antibiotics are drugs, not WBC products.

B. Antibodies respond to antigens, not to red cells as such.

C. Globulins include antibodies, but histamine is an allergy mediator, not the trigger named.

D. WBCs (B lymphocytes/plasma cells) make antibodies against antigens; correct.

Question Q43 Biology

The lymphatic vessels of the body empty the lymph into blood stream at ?

- A. Abdominal vein
- B. Jugular vein
- C. Subclavian vein ✓ **Correct answer**
- D. Bile duct

A. Not the drainage point.

B. The thoracic duct joins near the jugular–subclavian junction, but the named vessel is the subclavian vein.

C. The thoracic duct and right lymphatic duct drain into the subclavian veins; correct.

D. Carries bile to the duodenum; unrelated.

Question Q44 Biology

Flow of blood in the capillaries is adjusted by?

- A. Heart directly

- capillary sphincters ✓ **Correct answer**
- C. Meta-arteriole
- D. Valves

A. The heart sets overall pressure, not capillary-by-capillary flow.

B. Rings of smooth muscle at capillary entrances that open/close to regulate local flow; correct.

C. A thoroughfare vessel; it does not itself gate individual capillaries.

D. In veins/heart; capillaries have no valves.

Question Q45 Biology

The pressure exerted by a solution separated by a semipermeable membrane from pure water is_____?

- A. Osmotic Pressure ✓ **Correct answer**
- B. Soil potential
- C. Solute Potential
- D. Solvent potential

A. The pressure needed to prevent net solvent flow across the membrane; correct.

B. A soil-water concept, not this definition.

C. The component of water potential due to solutes (negative); not the pressure defined.

D. Not the standard term for this pressure.

Question Q46 Biology

Which of the following is NOT a consequence of anaerobic respiration in humans muscles cells?

- A. Cramps

n consumption of energy ✓ **Correct answer**

- C. Pain
- D. Tiredness

A. Associated with lactate accumulation and muscle fatigue.

B. The keyed exception: anaerobic respiration yields only 2 ATP per glucose (vs ≈32 aerobically), so it is an energy-POOR pathway, not a high-energy-consuming one. Flagged: the stem's wording is loose ("high consumption" is not a standard consequence term); the answer rests on the low-yield contrast. VERIFIED (Wave-17 addendum, 2 Nov 2026): Sparkl IGCSE (anaerobic respiration in muscles gives a net 2 ATP per glucose; lactic acid accumulation contributes to fatigue and soreness) + Fiveable (anaerobic glycolysis gives only 2 ATP net, much less than aerobic respiration; lactate/acidity contributes to the burning sensation and fatigue).

C. Lactate-associated muscle pain/soreness is a recognised consequence.

D. Fatigue follows anaerobic effort.

Question Q47 Biology

The respiratory surfaces exhibit following characteristic?

- A. It must be permeable ✓ **Correct answer**
- B. It must be thick for low diffusion
- C. It should be non-vascularized
- D. It should have low ventilation mechanism

A. Gases must cross the surface; permeability is essential; correct.

B. The opposite: respiratory surfaces must be THIN for fast diffusion.

C. The opposite: rich blood supply maintains the gradient.

D. The opposite: good ventilation maintains gas gradients.

Q48 Biology

Which of the following is a prokaryote?

- A. Protista
- B. E.coli ✓ **Correct answer**
- C. Amoeba
- D. Fungi

A. Eukaryotic kingdom.

B. A bacterium, hence a prokaryote (no nucleus); correct.

C. A eukaryotic protist.

D. Eukaryotic kingdom.

Question Q49 Biology

Number of layers present in Gram-negative bacterial cell wall :

- A. one
- B. two ✓ **Correct answer**
- C. three
- D. four

A. Gram-positive walls are described as one thick peptidoglycan layer; Gram-negative envelopes have more.

B. The keyed counting: an inner (cytoplasmic) membrane and an outer membrane, with thin peptidoglycan between them, counted as two membrane layers. Flagged: counting the peptidoglycan as a third layer gives three; the answer rests on the membrane-counting convention. VERIFIED (Wave-17 addendum, 2 Nov 2026): Wikipedia Gram-negative (a thin peptidoglycan cell wall sandwiched between an inner membrane and an outer membrane) + JoVE (Gram-negative bacteria produce two membranes separated by a periplasmic space and a peptidoglycan cell wall). Caveat retained: counting the

n sheet as a layer gives three, the filed answer counts membranes only, the paper's convention.

C. The count if peptidoglycan is counted separately from both membranes.

D. No standard count gives four.

Question Q50 Biology

The division of cocci in three planes form Sarcina, which is a cube of ---------- Cocci?

- A. 02
- B. 04
- C. 08 ✓ **Correct answer**
- D. 16

A. Division in one plane (diplococci/pairs).

B. Division in two planes (tetrads).

C. Working: division in three perpendicular planes gives 2 × 2 × 2 = 8 cells per packet. Correct.

D. Would need a further division round.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q51 Biology

Nitrifying bacteria are the examples of:

- A. Heterotrophic bacteria
- B. Chemosynthetic bacteria ✓ **Correct answer**
- C. Saprophytic bacteria
- D. Parasitic bacteria

ic compounds for energy/carbon; nitrifiers do not.

B. Nitrifiers gain energy by oxidising inorganic nitrogen compounds ($NH_3 \rightarrow NO_2^- \rightarrow NO_3^-$) and fix CO_2; correct.

C. Feed on dead organic matter; not nitrifiers.

D. Live at a host's expense; nitrifiers are free-living soil bacteria.

Question Q53 Biology

Which cells in the human males are responsible for the release of testosterone?

- A. Pituitary Gland
- B. Hypothalamus
- C. Sertoli cells
- D. Leydig cells or interstitial cells ✓ **Correct answer**

A. Releases LH, which STIMULATES testosterone release; it does not release testosterone.

B. Releases GnRH; it regulates but does not make testosterone.

C. Support spermatogenesis and make inhibin/ABP, not testosterone.

D. Secrete testosterone; correct.

Question Q54 Biology

Fertilized ovum is implanted and undergoes further development in the:

- A. Ovary
- B. Uterus ✓ **Correct answer**
- C. Oviduct
- D. Cervix

A. Site of ovulation; implantation here would be an ectopic (ovarian) pregnancy.

…cyst implants in the endometrium and develops there; correct.

C. Usual site of FERTILISATION; implantation here is an ectopic (tubal) pregnancy.

D. The lower outlet of the uterus; not the implantation site.

Question Q55 Biology

Level of luteinizing hormone (LH) is maximum in blood during which stage of menstrual cycle?

- A. Menstrual stage
- B. Proliferative stage
- C. Ovulation stage ✓ **Correct answer**
- D. Secretory stage

A. LH is low; hormone withdrawal causes bleeding.

B. LH rises toward the end, but the peak is at ovulation.

C. The LH surge triggers ovulation; maximum level; correct.

D. LH is low; progesterone dominates.

Question Q56 Biology

Major source of transmission of syphilis is:

- A. Blood transfusion
- B. Insect bite
- C. Contaminated water
- D. Sexual contact ✓ **Correct answer**

A. Possible historically, but screening makes it rare and it is not the major route.

B. Syphilis is not insect-borne.

this route.

D. Treponema pallidum spreads mainly through sexual contact with infectious lesions; correct.

Question Q57 Biology

What is FALSE about cartilage?

- A. There are many blood vessels in cartilage ✓ **Correct answer**
- B. It is a form of connective tissue
- C. It covers ends of the bones at joints
- D. It is much softer than bone

A. FALSE: cartilage is avascular; it is nourished by diffusion. Correct as the false statement.

B. True: cartilage is a specialised connective tissue.

C. True: articular cartilage covers joint surfaces.

D. True: cartilage is flexible and softer than mineralised bone.

Question Q58 Biology

Which of the following is a muscle component that act as store for energy?

- A. ATP
- B. Creatine-PO4 ✓ **Correct answer**
- C. Myoglobin
- D. Creatinine-PO4

A. The immediate energy currency, used at once; not the store.

B. The rapid high-energy-phosphate reserve that regenerates ATP; correct.

C. Stores OXYGEN, not energy.

e is a breakdown waste product; no such energy store exists.

Question Q59 Biology

Which of the following is NOT found in skeletal muscle fibers in human?

- A. Multiple nuclei
- B. Multiple mitochondria
- C. Large amount of myoglobin
- D. Large amount of hemoglobin ✓ **Correct answer**

A. Skeletal fibres are multinucleate; present.

B. Abundant for aerobic energy; present.

C. Present as the muscle oxygen store.

D. Haemoglobin is in RED BLOOD CELLS, not inside muscle fibres; correct as the exception.

Question Q60 Biology

Hinge joint is present between which of the following bones?

- A. Humerus and radio-ulna ✓ **Correct answer**
- B. Femur and pectoral girdle
- C. Femur and acetabulum
- D. Humerus and pectoral girdle

A. The elbow: a hinge joint (flexion/extension); correct.

B. No such joint exists (femur meets the pelvis).

C. The hip: a BALL-AND-SOCKET joint.

D. The shoulder: a ball-and-socket joint.

Q61 Biology

What happens when a Rh -ve woman, married to a Rh +ve man conceives a child who is Rh +ve?

- A. Maternal-foetal incompatibility ✓ **Correct answer**
- B. Paternal-foetal incompatibility
- C. Cancer of fetus
- D. Death of mother

A. Maternal anti-Rh antibodies attack the Rh-positive foetus's red cells (haemolytic disease of the newborn); correct.

B. Not the term; the conflict is maternal vs foetal.

C. No such consequence.

D. The mother is not endangered in this way; the foetus/newborn is at risk.

Question Q62 Biology

DNA stores biological information in discrete units termed as:

- A. Genes ✓ **Correct answer**
- B. Phenotypes
- C. Karyotypes
- D. Cells

A. Discrete DNA units carrying hereditary information; correct.

B. Observable traits produced by genes + environment.

C. The chromosome set of a cell.

D. The units of life, not of stored information.

Q63 Biology

To study sex linkages in Drosophila, Morgan mated white eyed males with wild type red eyed females. What will be the phenotype of offspring?

- A. All red eyed males and females ✓ **Correct answer**
- B. Red eyed females and white eyed males
- C. White eyed females and red eyed males
- D. All white eyed females and males

A. Working: white eye is X-linked recessive. Cross: X^wY (male) × X^+X^+ (female) → daughters X^+X^w (red, carriers), sons X^+Y (red). Correct.

B. That is the RECIPROCAL cross (white females × red males).

C. No such outcome here.

D. Would need both parents to carry white alleles.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q64 Biology

Which one of the following is X Linked Dominant disorder?

- A. Haemophilia
- B. Color blindness
- C. Hypophosphatemic rickets ✓ **Correct answer**
- D. Hypertrichosis

A. X-linked RECESSIVE.

B. X-linked recessive.

C. X-linked DOMINANT (vitamin-D-resistant rickets); correct.

hairy ears) in the classic textbook example, not X-linked dominant.

Question Q65 Biology

Mode of inheritance in humans can be traced through:

- A. Experimental Mating
- B. Chi Square Chart
- C. Pedigree Analysis ✓ **Correct answer**
- D. Probability Analysis

A. Not possible/ethical in humans.

B. A statistical test, not a tracing method.

C. Family trees tracing a trait through generations; correct.

D. Used WITH pedigrees, but the tracing method itself is the pedigree.

Question Q66 Chemistry

One a. m .u stands for

- A. An atom of C - 12
- B. 1/12th of a carbon ✓ **Correct answer**
- C. 1/12th of H
- D. 1 atom of all the elements

A. That is 12 amu, not one.

B. The definition of the atomic mass unit; correct.

C. Hydrogen is not the reference.

D. Meaningless: atoms differ in mass.

Q67 Chemistry

A compound of sodium oxide has 74.2 % sodium and 25.8% of Oxygen. The empirical formula of the compound is?

- A. NaO
- B. NaO2
- C. Na2O ✓ **Correct answer**
- D. Na2O2

A. 1:1, would need 58.9% Na.

B. 1:2, would need 41.9% Na.

C. Working: Na: 74.2/23 ≈ 3.23 mol; O: 25.8/16 ≈ 1.61 mol; ratio 3.23:1.61 ≈ 2:1 → Na_2O. Correct.

D. Sodium peroxide, 1:1 ratio, would need 58.9% Na.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q68 Chemistry

30 grams of 2-propanol were mixed with excess acidified K2Cr2O7 and boiled under reflux for 20 minutes. The organic product was then collected by distillation. The yield of product was 75.0%. What is the mass of product produced?

- A. 1.74g
- B. 21.75g ✓ **Correct answer**
- C. 2.74g
- D. 29.9 g

A. Decimal error.

B. Working: 2-propanol (M_r 60) oxidises to acetone/propanone (M_r 58). Moles = 30/60 =

eoretical acetone = 0.50 × 58 = 29.0 g; at 75% yield = 0.75 × 29.0 ≈ 21.75 g. Correct.

C. Decimal error.

D. Near the theoretical yield, ignoring the 75% factor (and slightly off).

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q69 Chemistry

According to which scientist, the probability of finding an electron at a certain position is possible?

- A. Bohr's
- B. De-Broglie
- C. Hund's
- D. Schrodinger ✓ **Correct answer**

A. Fixed orbits with definite positions; no probability.

B. Matter waves/wavelength, not the probability interpretation.

C. Orbital filling rules.

D. Wave mechanics: $|\psi|^2$ gives the probability density of finding the electron; correct.

Question Q70 Chemistry

Which gas in the discharge tube produces lightest canal ray particles?

- A. Ar
- B. He
- C. H2 ✓ **Correct answer**
- D. Ne

s are heavy ($A_r \approx 40$).

B. Helium ions ($A_r \approx 4$) are light but heavier than protons.

C. Gives H^+ (protons), the lightest positive ions; correct.

D. Neon ions ($A_r \approx 20$) are heavier than H^+.

Question Q71 Chemistry

Which element has the ground state electronic configuration of 1s2, 2s2, 2p6, 3s2, 3p6?

- A. Ar ✓ **Correct answer**
- B. Cl
- C. Na
- D. S

A. Working: total electrons = 2+2+6+2+6 = 18 = atomic number 18. Correct.

B. Configuration ends $3p^5$.

C. Ends $3s^1$.

D. Ends $3p^4$.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q72 Chemistry

What is the proton (atomic number) of an element that has four unpaired electrons in its ground state?

- A. 6
- B. 14
- C. 22
- D. 26 ✓ **Correct answer**

ired p electrons.

B. Two unpaired p electrons.

C. Two unpaired d electrons.

D. Working: four unpaired electrons ⇒ d^6 high-spin (or equivalent): iron, [Ar] $3d^6 4s^2$, has four unpaired 3d electrons. Four unpaired d electrons; correct.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q73 Chemistry

A gaseous mixture contains 9.6% NH3, 22.6% N2 and 67.8% H2 gases. If the total pressure is 50 atm, then the partial pressure of H2 is

- A. 67.8 x100 / 50
- B. 50 x 100 / 100
- C. 67.8 x 50 / 100 ✓ **Correct answer**
- D. 67.8 + 50 / 100

A. Inverts the calculation (gives 135.6).

B. Gives 50 atm (the total pressure).

C. Working: $p(H_2)$ = mole fraction × total pressure = (67.8/100) × 50 atm = 33.9 atm, i.e. the expression in C. Correct expression.

D. A meaningless sum.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Q74 Chemistry

If we want to raise the temperature of one mole of an ideal gas by one kelvin, we have to provide how much amount of energy?

- A. 0.0821 joules
- B. 8.314 dm3·atm
- C. 0.0821 kJ
- D. 0.0821 dm3·atm ✓ **Correct answer**

A. Wrong units/value: R = 8.314 $J \cdot mol^{-1} \cdot K^{-1}$.

B. Mixes the joule value with $dm^3 \cdot atm$ units (8.314 $dm^3 \cdot atm$ would be ≈842 J).

C. 82.1 J; wrong.

D. The keyed expression of R in $dm^3 \cdot atm$ units. Flagged: the option as printed omits "per mole per kelvin"; it is the VALUE of R, not literally "energy to raise 1 mol by 1 K" (which depends on the process: C_V or C_p). The answer is the paper's R-value convention. VERIFIED (Wave-16 addendum, 1 Nov 2026): NIST CODATA molar gas constant 0.082057 $L \cdot atm \cdot K^{-1} \cdot mol^{-1}$ (rounds to 0.0821) + worked derivation from the SI value 8.314462618 $J \cdot mol^{-1} \cdot K^{-1}$ ÷ 101.325 J per L·atm = 0.08206 $L \cdot atm \cdot mol^{-1} \cdot K^{-1}$. Caveat retained: the option omits "per mole per kelvin" and the stem's framing is loose; the promotion confirms the VALUE and its units.

Question Q75 Chemistry

The process of heat flow between hotter and colder gases remains continued until all the molecules have equal

- A. Average translational kinetic energy ✓ **Correct answer**
- B. Average rotational kinetic energy
- C. Average translational potential energy
- D. Average vibrational kinetic energy

ure is a measure of average translational kinetic energy; heat flows until temperatures (hence this average) equalise; correct.

B. Contributes to internal energy but is not the temperature measure in the kinetic-theory framing.

C. Ideal-gas molecules have no significant potential energy.

D. A minor contributor at ordinary temperatures, not the equalising quantity.

Question Q76 Chemistry

In liquid, with the change in dipole-dipole forces, there is a change in some physical properties. Select the property which is not affected by the strength of dipole-dipole forces?

- A. boiling point
- B. heat of vaporization
- C. heat of sublimation
- D. moles ✓ **Correct answer**

A. Rises with stronger dipole–dipole forces.

B. Rises with stronger forces.

C. Also reflects intermolecular-force strength.

D. An amount of substance; it is not a property affected by force strength; correct.

Question Q77 Chemistry

Which of the following factor does not affect the magnitude of vapor pressure?

- A. amount of liquid ✓ **Correct answer**
- B. size of molecule
- C. temperature of liquid

A. Given some liquid present, equilibrium vapour pressure is independent of the amount; correct.

B. Affects intermolecular forces and hence vapour pressure.

C. Strongly affects vapour pressure.

D. Stronger forces lower vapour pressure.

Question Q78 (printed 81) Chemistry

Q.81 A small building block which belongs to whole information about crystal structure is called?

- A. Cell
- B. Unit Cell ✓ **Correct answer**
- C. Crystal lattice
- D. Crystal unit

A. Too vague (also a biological term).

B. The smallest repeating unit carrying all the crystal's structural information; correct.

C. The whole extended array built by repeating the unit cell.

D. Not the standard term. (Stem carries printed number Q.81; see numbering note.)

Question Q80 (printed 83) Chemistry

Q.83 The decrease in solubility of the salt in a solution that already contains an ion common to that salt is known as:

- A. Le Chatelier's principle
- B. Solubility Product
- C. Common ion effect ✓ **Correct answer**

A. The general principle explaining the shift, not the name of the phenomenon.

B. The equilibrium constant Ksp, not the phenomenon.

C. The named phenomenon; correct.

D. The constant, not the effect.

Question Q81 (printed 84) Chemistry

Q.84 The precipitation occurs if the ionic concentration is:

- A. Less than ksp
- B. More than ksp ✓ **Correct answer**
- C. Equal to ksp
- D. Present in any amount

A. Undersaturated; no precipitation.

B. Working: precipitation when ionic product Q > Ksp. Supersaturated; precipitation occurs; correct.

C. Saturated equilibrium; no net precipitation.

D. False; concentration matters.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q82 (printed 85) Chemistry

Q.85 One can estimate the direction in which equilibrium will shift with the help of:

- A. Le Chatelier's principle ✓ **Correct answer**
- B. Law of mass action

- D. Law of heat of formation

A. Predicts the direction of shift when conditions change; correct.

B. Gives the equilibrium expression, not the shift direction.

C. No such law (a distractor).

D. Concerns enthalpies, not shift direction.

Question Q83 (printed 86) Chemistry

Q.86 What is the overall order of this rate equation? Rate =k[H3][NO2]2

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

A. Only the first exponent.

B. Only the second exponent.

C. Working: overall order = sum of exponents = 1 + 2 = 3. Correct.

D. No exponent sum gives 4. (The equation as printed is chemically odd — "[H3]" presumably stands for a reactant such as H_2 — but the order arithmetic is unaffected.)

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q84 (printed 87) Chemistry

Q.87 The catalysis in which the catalyst and the reactants are in the same phase is known?

- B. Homogeneous catalyst ✓ **Correct answer**
- C. Slow
- D. Fast

A. Catalyst in a DIFFERENT phase from reactants.

B. Same phase (e.g. all in solution); correct.

C. A rate description, not a catalysis type.

D. Likewise a rate description.

Question Q85 (printed 88) Chemistry

Q.88 Born-Haber cycle is used to determine the Lattice energy of ionic compounds. It is the application of

- A. Henry's law
- B. Le - Chatleir's Principle
- C. Hess's law ✓ **Correct answer**
- D. Common ion effect

A. Gas solubility; unrelated.

B. Equilibrium shifts; unrelated.

C. Enthalpy is a state function, so the cycle's steps sum to the lattice energy; correct.

D. Solubility; unrelated.

Question Q86 (printed 89) Chemistry

Q.89 Which of the following term is state function?

- A. freezing
- B. decomposition

- D. enthalpy ✓ **Correct answer**

A. A process/change, not a state function.

B. A process.

C. A process.

D. Depends only on the state (H = E + pV); correct.

Question Q87 (printed 90) Chemistry

Q.90 An electrochemical cell is based upon which reaction?

- A. Acid-base reaction
- B. Redox reaction ✓ **Correct answer**
- C. Nuclear reaction
- D. Neutralization reaction

A. Proton transfer; not the basis of cells.

B. Oxidation at one electrode, reduction at the other, driving electron flow; correct.

C. Nuclear decay/fission; not cell chemistry.

D. An acid–base reaction; not the basis of cells.

Question Q88 (printed 91) Chemistry

Q.91 In which of the following, oxygen shows fractional oxidation number?

- A. OF_2
- B. Na_2O_2
- C. KO_2 ✓ **Correct answer**
- D. Cl_2O_7

B. Integral −1.

C. Working: OF_2: O = +2. Na_2O_2 (peroxide): O = −1. KO_2 (superoxide): average O = −½ (fractional). Cl_2O_7: O = −2. Fractional −½; correct.

D. Integral −2.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q89 (printed 92) Chemistry

Q.92 Which of the following element has smaller size?

- A. Na
- B. K
- C. Al ✓ **Correct answer**
- D. Li

A. Larger than Al and Li.

B. Largest of the four.

C. Working: atomic radii ≈ Li 152 pm, Na 186 pm, K 227 pm, Al 143 pm. Size falls across a period (rising nuclear charge) and rises down a group. Smallest, despite being in period 3, because of its higher effective nuclear charge; correct.

D. Small, but larger than Al.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Q90 (printed 93) Chemistry

Q.93 Among LiCl, BeCl2, NaCl, CsCl, the compounds with the greatest and the least ionic character respectively are:

- A. LiCl and CsCl
- B. NaCl and LiCl
- C. CsCl and NaCl
- D. CsCl and BeCl2 ✓ **Correct answer**

A. Reverses the order.

B. NaCl is not the most ionic; LiCl is not the least.

C. NaCl is far more ionic than $BeCl_2$.

D. Working: ionic character rises with large, low-charge cations and falls as the cation polarises the anion (Fajans' rules). Correct: Cs^+ is large/least polarising; Be^{2+} is small/highly polarising.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q91 (printed 94) Chemistry

Q.94 Which statement describes the conversion of magnesium atoms to magnesium ions for ionic bond formation with chlorine?

- A. The change is reduction, because there has been a gain of electrons
- B. The change is oxidation, because there has been a loss of electrons ✓ **Correct answer**
- C. The change is reduction, because there has been a loss of electrons
- D. The change is oxidation, because there has been a gain of electrons

A. Reduction + gain: wrong on both counts.

$Mg \rightarrow Mg^{2+} + 2e^-$. Oxidation is loss of electrons; correct.

C. Reduction is gain, not loss.

D. Oxidation is loss, not gain.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q92 (printed 95) Chemistry

Q.95 AB4 Type with no Lone Pairs geometry enables to form which shape of molecule?

- A. Trigonal
- B. Regular tetrahedron ✓ **Correct answer**
- C. Regular octahedron
- D. Regular pyramidal

A. AB_3 geometry (e.g. trigonal planar/pyramidal with a lone pair).

B. Four bond pairs, no lone pairs (VSEPR AX_4): e.g. CH_4; correct.

C. AB_6 geometry.

D. AB_3 with one lone pair (e.g. NH_3).

Question Q93 (printed 96) Chemistry

Q.96 Why dimer of Aluminum chloride is formed

- A. Aluminum is electron rich
- B. Aluminum is having lone pair of electron
- C. Aluminum donates lone pair to form bridge
- D. Aluminum forms coordinate bonds with chlorine to complete its octet ✓ **Correct answer**

A. Aluminium in $AlCl_3$ is electron-DEFICIENT (sextet).

n has no lone pair to give.

C. Aluminium ACCEPTS electron density; it donates nothing.

D. Two $AlCl_3$ units dimerise to Al_2Cl_6 via chlorine bridges donating lone pairs to Al; correct.

Question Q94 (printed 97) Chemistry

Q.97 Which group of the periodic table contain non-metals, metalloids and metals.

- A. I B
- B. VII A
- C. IV A ✓ **Correct answer**
- D. VI A

A. Transition metals (Cu, Ag, Au).

B. Halogens (non-metals only).

C. C (non-metal), Si/Ge (metalloids), Sn/Pb (metals); correct.

D. O, S, Se, Te, Po: non-metals/metalloid, no typical metal in the textbook framing.

Question Q95 (printed 98) Chemistry

Q.98 Which of the following sulfate compound is insoluble in water ?

- A. BeSO4
- B. BaSO4 ✓ **Correct answer**
- C. MgSO4
- D. CaSO4

A. Soluble.

B. Essentially insoluble (the classic white precipitate); correct.

C. Soluble (Epsom salt).

soluble, but far more soluble than $BaSO_4$; the clearly insoluble one is $BaSO_4$.

Question Q97 Chemistry

In which pair one has all Unpaired d orbitals while other have all paired d orbitals ?

- A. Cu and Zn
- B. Cr and Fe
- C. Cr and Zn ✓ **Correct answer**
- D. Mn and Co

A. Cu ($3d^{10}4s^1$) has NO unpaired d electrons.

B. Fe ($3d^6$) has paired d electrons too.

C. Working: Cr: [Ar] $3d^5 4s^1$ — all five d orbitals singly occupied. Zn: [Ar] $3d^{10}4s^2$ — all d electrons paired. Correct.

D. Mn ($3d^5$) unpaired, but Co ($3d^7$) has paired d electrons as well.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q98 Chemistry

In which of the following functional groups, the carbon atom is sp hybridized?

- A. -CHO
- B. -COOH
- C. -CN ✓ **Correct answer**
- D. -COOR

A. Aldehyde carbon: sp^2.

B. Carboxyl carbon: sp^2.

C. Nitrile carbon in C≡N: sp-hybridised; correct.

onyl carbon: sp^{-}.

Question Q99 Chemistry

The compounds containing R-SH functional group are known as:

- A. Alcohols
- B. Thio-alcohols ✓ **Correct answer**
- C. Thio-ether
- D. Nitrile

A. R–OH.

B. R–SH, the sulphur analogues of alcohols; correct (the modern name is "thiols").

C. R–S–R.

D. R–C≡N.

Question Q100 Chemistry

What is the number of isomers of a hydrocarbon having a molecular formula, C4H8?

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

A. Each misses at least one skeleton.

B. Each misses at least one skeleton.

C. Each misses at least one skeleton.

D. Working: structural isomers: but-1-ene, cis-but-2-ene and trans-but-2-ene are sometimes counted separately; counting STRUCTURAL (constitutional) isomers as the paper does: but-1-ene, but-2-ene, 2-methylpropene, cyclobutane, methylcyclopropane = 5.

...e paper's counting (cis/trans counted as one structural isomer).

Note: Explanations for options A/B/C share one grouped paragraph in the .md; the same text is shown under each. The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q101 Chemistry

Alkylbenzene is formed when benzene is treated with an alkyl halide in the presence of anhydrous aluminum chloride. Identify the type of reaction.

- A. Halogenation
- B. Friedel-Crafts acylation reaction
- C. Friedel-Crafts alkylation reaction ✓ **Correct answer**
- D. Sulphonation

A. Introduces halogen (X_2/FeX_3), not an alkyl group.

B. Uses an ACYL halide to add –COR.

C. Benzene + R–X/$AlCl_3$ → alkylbenzene; correct.

D. Adds –SO_3H with concentrated H_2SO_4.

Question Q102 Chemistry

Three alternate single and double bonds in benzene are called?

- A. Conjugate bonds ✓ **Correct answer**
- B. Coordinate covalent bonds
- C. Fixed bonds
- D. Ionic bonds

A. The alternating single/double (conjugated) π system; correct as the paper's term.

B. Bonds where both electrons come from one atom; not benzene's bonding.

bonds are delocalised, not fixed alternating bonds (that is the outdated Kekulé picture).

D. No ions in benzene.

Question Q103 Chemistry

Which of the following compound is more acidic?

- A. Alkane
- B. Alkene
- C. Alkyne ✓ **Correct answer**
- D. Cycloalkane

A. Least acidic.

B. More acidic than alkanes, less than alkynes.

C. Working: acidity follows s-character of the C–H bond: sp (alkyne, pKa ≈ 25) > sp^2 (alkene, ≈44) > sp^3 (alkane, ≈50). Terminal alkynes are the most acidic; correct.

D. sp^3, like alkanes: least acidic.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q104 Chemistry

Consider the chlorination of methane, the attack of chlorine free radical on methane form methyl free radical occurs in ?

- A. Initiation step
- B. Propagation step ✓ **Correct answer**
- C. Termination step
- D. Last step

(homolysis).

B. $Cl\cdot + CH_4 \rightarrow \cdot CH_3 + HCl$, then $\cdot CH_3 + Cl_2 \rightarrow CH_3Cl + Cl\cdot$: radicals consumed and regenerated; correct.

C. Two radicals combine (e.g. Cl· + Cl·).

D. Not a mechanistic term.

Question Q105 Chemistry

The ratio of sigma to pi electrons in benzene is?

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

A. Inverted and wrong.

B. Would need 18 σ electrons.

C. Working: σ electrons: 6 C–C σ bonds (12 e^-) + 6 C–H σ bonds (12 e^-) = 24. π electrons: 6. Ratio 24:6 = 4:1. Correct.

D. Inverted.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q106 Chemistry

When halogen is removed from an alkyl halide a carbocation is formed, identify the most reactive carbocation

- A. Primary carbocation
- B. Secondary carbocation

- tiary carbocation ✓ **Correct answer**
- D. Methyl carbocation

A. Less stabilised than secondary/tertiary.

B. Intermediate stability.

C. The keyed answer: most stabilised by hyperconjugation/inductive donation, hence formed fastest and "most reactive" in the SN1 sense the paper means. Flagged: "most reactive" conflates stability with reactivity — a tertiary carbocation is the most STABLE and the most readily FORMED; its stability is precisely why it reacts more slowly with nucleophiles once formed. VERIFIED (Wave-17 addendum, 2 Nov 2026): LibreTexts 10.9 (stability order tertiary > secondary > primary > methyl, explained by hyperconjugation and inductive dispersal of charge) + independent derivation (hyperconjugation grows with the number of alpha-hydrogens able to donate into the empty p orbital — 9 for tertiary, 6 for secondary, 3 for primary, 0 for methyl — which reproduces the same stability order). Caveat retained: the stem says "most reactive" while the sources rank stability; the promotion rests on the standard textbook identification of "most reactive" here with "most readily formed / most stable".

D. Least stabilised of all.

Question Q107 Chemistry

Freon is commonly known as ?

- A. Refrigerant ✓ **Correct answer**
- B. A solvent
- C. Insecticides
- D. A fire extinguisher

A. Freon is the trade name for chlorofluorocarbon refrigerants; correct.

B. Freons were used as solvents/propellants, but "refrigerant" is the defining common name.

anochlorines are insecticides (DDT), not Freon.

D. Halons are fire-suppressants; Freon is not the fire-extinguisher name.

Question Q108 Chemistry

Neopentylchloride belongs to which class of alkyl halides?

- A. Primary alkyl halides ✓ **Correct answer**
- B. Secondary alkyl halides
- C. Tertiary alkyl halides
- D. Quaternary alkyl halides

A. Working: neopentyl chloride is $(CH_3)_3C–CH_2Cl$; the $–CH_2Cl$ carbon is bonded to only ONE other carbon. Correct: classification follows the carbon bearing the halogen.

B. Would need the halogen carbon bonded to two carbons.

C. Would need three.

D. No such alkyl-halide class (a carbon cannot bear halogen + four carbons).

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q109 Chemistry

What is the common name of 1,2,3-propanetriol?

- A. Butyl alcohol
- B. Glycol
- C. Glycerol ✓ **Correct answer**
- D. Propyl alcohol

A. A 4-carbon mono-alcohol.

B. A DIOL (e.g. ethylene glycol).

anetriol (glycerine), correct.

D. A 3-carbon mono-alcohol (propan-1-ol/2-ol).

Question Q110 Chemistry

When Phenol reacts with formaldehyde, which of the following product is produced?

- A. Adduct ✓ **Correct answer**
- B. Hydronium ion
- C. Oxonium ion
- D. Phenoxide ion

A. The keyed answer: phenol–formaldehyde addition products, which polymerise to Bakelite-type resins. Flagged: "adduct" is vague — the useful product is the phenol–formaldehyde RESIN; the question asks for a loose label, and A is the only product-like option. VERIFIED (Wave-17 addendum, 2 Nov 2026): BenchChem (phenol-formaldehyde resins are obtained by reaction of phenol with formaldehyde; phenoxide attacks formaldehyde forming hydroxymethylphenols, which condense to resin/Bakelite) + ScienceDirect (phenol-formaldehyde condensation products; resols contain hydroxymethyl groups condensing to a three-dimensional network). Caveat retained: the precise product is the resin and "adduct" is a loose label; the promotion rests on elimination — B, C and D are ions that this reaction does not produce — plus the documented addition chemistry.

B. Not a product of this reaction.

C. Not a product.

D. Formed by phenol + strong base (NaOH), not by formaldehyde.

Question Q111 (printed 115) Chemistry

Q.115 Which of the following is the correct name of CH3CH2CH2COCH2CHO?

- B. 3-one hexanal
- C. 3-oxo hexanol
- D. 3- keto hexanol

A. Working: six-carbon chain, aldehyde at C-1 has priority (suffix –al); the ketone at C-3 is a prefix "oxo". Correct.

B. "One" is a suffix, not a prefix; wrong form.

C. "–ol" implies an alcohol; there is none.

D. Wrong prefix and wrong suffix.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q112 Chemistry

Which of the following is also called silver mirror test?

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

A. Blue → brick-red precipitate for reducing sugars; not the mirror test.

B. Red Cu_2O precipitate; not the mirror test.

C. Yellow CHI_3 precipitate for methyl ketones/ethanol.

D. Ammoniacal $AgNO_3$ oxidises aldehydes, depositing a silver mirror; correct.

Q113 Chemistry

Which among the following have least pH?

- A. CH3CH2COOH
- B. CH2ClCH2COOH
- C. CH3CHCl2 COOH ✓ **Correct answer**
- D. CH3CH2CH2COOH

A. No Cl; weakest acid, highest pH.

B. One Cl, distant from –COOH; moderately stronger.

C. Working: electron-withdrawing Cl atoms increase acidity (lower pH). Two Cl atoms near the carboxyl group: strongest acid, lowest pH; correct.

D. No Cl; weakest. (Option C as printed, CH_3CHCl_2COOH, is 2,2-dichloropropanoic acid; the two chlorines' –I effect dominates regardless of exact numbering.)

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q114 (printed 119) Chemistry

Q.119 If carboxylic acid and ketone groups C=O are present in a chain then final name will be given as

- A. oxo, oic acid ✓ **Correct answer**
- B. one, oic acid
- C. Both 1 and 2
- D. None of these

A. Carboxylic acid has priority (suffix "oic acid"); the ketone is named by the prefix "oxo-"; correct.

B. "–one" is a suffix and cannot be combined with the higher-priority "oic acid" suffix.

ows IUPAC priority rules.

D. A is correct.

Question Q115 Chemistry

When carboxylic acids and dicarboxylic acids have similar molecular weights, how do their melting points compare?

- A. Carboxylic acids have greater melting points
- B. Dicarboxylic acids have greater melting points ✓ **Correct answer**
- C. Both acids have similar melting points
- D. No any consistent trends exits

A. Reverses the trend.

B. Two –COOH groups give more extensive intermolecular H-bonding and a more stable lattice, raising melting points; correct.

C. The difference is systematic, not negligible.

D. A consistent trend does exist.

Question Q116 Biology

When food reaches stomach, the action of which of the following come to an end due to acidic PH?

- A. Lipases
- B. Amylase ✓ **Correct answer**
- C. Maltase
- D. Hydrolases

A. Gastric lipase works IN the stomach's acid; lingual/salivary lipase is not the named case.

B. Salivary amylase is inactivated by stomach acid (pH ≈ 2), ending starch digestion in the

se, correct.

C. Acts in the small intestine, not ended by stomach acid in this framing.

D. A general class; far too broad to be the answer.

Question Q117 Biology

Which of the following proteins acts as carrier of copper in blood plasma?

- A. Hemoglobin
- B. Glycoprotein
- C. Ceruloplasmin ✓ **Correct answer**
- D. Histone

A. Carries oxygen in red cells, not copper in plasma.

B. A general class, not the specific carrier.

C. The major copper-carrying (ferroxidase) protein of plasma; correct.

D. Nuclear DNA-packaging protein.

Question Q118 Physics

What is the shape of velocity-time graph for constant acceleration?

- A. Parabola line
- B. Straight line ✓ **Correct answer**
- C. Incline curve
- D. Decline curve

A. That is the DISPLACEMENT–time graph for constant acceleration.

B. Working: a = dv/dt = constant ⇒ v = u + at, a linear function. Correct (slope = acceleration).

graph would mean changing acceleration.

D. Likewise curved; "decline" alone is not the shape.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q119 Physics

Which of the following is the correct definition of variable velocity?

- A. Unequal distances are covered in equal intervals of time
- B. Equal displacements are made in unequal intervals of time
- C. Unequal displacements are made in equal intervals of time ✓ **Correct answer**
- D. Equal displacements are made in equal intervals of time

A. "Distance" (scalar) with changing speed is variable SPEED; the velocity definition uses displacement.

B. Also describes changing velocity, but the standard definition is framed in equal time intervals.

C. Velocity (displacement/time) changes; correct as the paper's definition.

D. That is UNIFORM velocity.

Question Q120 Physics

A stone thrown horizontally from the top of a tall building follows a path that is:

- A. Circular
- B. Made of two straight line segments
- C. Hyperbolic
- D. Parabolic ✓ **Correct answer**

A. Needs a centre-seeking force of constant magnitude.

inked path.

C. Not the trajectory under uniform gravity.

D. Working: horizontal velocity constant, vertical acceleration = g: $x = ut$, $y = \frac{1}{2}gt^2 \Rightarrow y \propto x^2$, a parabola. Correct.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q121 Physics

Which of the following is incorrect?

- A. Reaction force on a body is always balanced by the action force ✓ **Correct answer**
- B. Reaction and action forces are always equal
- C. Action and reaction forces never act on the same body
- D. Newton's Third Law is always valid in all situations

A. INCORRECT: action and reaction act on DIFFERENT bodies, so they never balance each other on one body; correct as the incorrect statement.

B. True: action = reaction in magnitude.

C. True: they act on different bodies.

D. True within classical mechanics (the paper's framing).

Question Q122 Physics

A fireman wants to slide down a rope. The breaking load of the rope is 3/4 th of the weight of the man. With what acceleration should the fire man slide down? (Acceleration due to gravity is 'g')

- A. g

- C. 3g/4
- D. 0

A. Free fall: T = 0, but the stem asks for the acceleration AT the breaking load.

B. Working: tension T = m(g − a). Breaking load = ¾mg. Set T = ¾mg ⇒ g − a = ¾g ⇒ a = g/4 (the MAXIMUM safe acceleration; sliding at exactly this keeps tension at the limit). Correct.

C. Would give T = mg/4, below the limit but not the value asked.

D. Hanging still: T = mg, above the breaking load. (Stem's parenthetical is left unfinished in the transcription.)

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q123 Physics

When a heavy coin falls a short distance towards the ground it does not reach terminal velocity. Why is this so?

- A. The coin has not hit the ground
- B. The weight of coin is equal to air resistance
- C. The weight of coin increases as air resistance increases
- D. The weight of coin is more than air resistance ✓ **Correct answer**

A. The printed key, but WRONG: it states a trivial fact, not a reason — hitting the ground ENDS the fall; it does not explain why terminal velocity was not reached.

B. That IS the terminal-velocity condition; it has not been reached, so B is false here.

C. Weight is constant during the fall.

D. TRUE during acceleration (net force downward), and the real reason is that the fall is

or air resistance to grow to equal the weight; correct. VERIFIED: GauthMath exact-stem + SaveMyExams — the weight exceeds air resistance throughout the short fall, so drag never grows to balance the weight and terminal velocity is never reached.

Question Q124 Physics

The consumption of energy by a 60 W bulb in 2 s is:

- A. 120 J ✓ **Correct answer**
- B. 60 J
- C. 30 J
- D. 0.02 J

A. Working: E = Pt = 60 × 2 = 120 J. Correct.

B. One second's worth.

C. Half a second's worth.

D. No combination gives this.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q125 Physics

A long spring, when stretched by a distance x, has potential energy V. On increasing the stretching to nx, the potential energy of the spring will be:

- A. nV
- B. V/n
- C. n^2 V ✓ **Correct answer**
- D. V/n^2

A. Linear scaling; wrong (energy is quadratic in extension).

; impossible.

C. Working: $V = \frac{1}{2}kx^2$; stretching to nx gives $\frac{1}{2}k(nx)^2 = n^2(\frac{1}{2}kx^2) = n^2V$. Correct.

D. Decreases; impossible.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q126 Physics

Ignoring details associated with friction, extra forces exerted by arm and leg muscles, and other factors, we can consider a pole vault as the conversion of an athlete's running kinetic energy to gravitational potential energy. If an athlete is to lift his body 5 m during a vault, what speed must he have when he plants his pole?

- A. 5 m/s
- B. 10 m/s ✓ **Correct answer**
- C. 15 m/s
- D. 20 m/s

A. Gives only 1.25 m of lift (with g = 10).

B. Working: $\frac{1}{2}mv^2 = mgh \Rightarrow v = \sqrt{(2gh)} = \sqrt{(2 \times 10 \times 5)} = \sqrt{100} = 10$ m/s (using $g \approx 10$ m/s^2, the paper's value). Correct.

C. Gives 11.25 m.

D. Gives 20 m.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q127 Physics

A particle of mass m at rest is acted upon by a force P for time t. Its kinetic energy after

- A. (P^2 t^2)/m
- B. (P^2 t^2)/2m ✓ **Correct answer**
- C. (P^2 t^2)/3m
- D. (P^2 t^2)/4m

A. Missing the ½.

B. Working: a = P/m; v = at = Pt/m; KE = ½mv² = ½m(P²t²/m²) = P²t²/(2m). Correct.

C. Wrong denominator 3.

D. Wrong denominator 4.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q128 Physics

The number of revolutions in 3π radians is:

- A. 1/60
- B. 3/2 ✓ **Correct answer**
- C. 2
- D. 6

A. No relation.

B. Working: 1 revolution = 2π rad, so 3π ÷ 2π = 3/2 revolutions. Correct.

C. Would be 4π rad.

D. Would be 12π rad.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Q129 Physics

If a flywheel is rotating at 3.0 rad/s, the time it takes to complete one revolution is about

- A. 0.67 s
- B. 1.0 s
- C. 1.3 s
- D. 2.1 s ✓ **Correct answer**

A. That is 2/3, the reciprocal without π.

B. Would need ω = 2π.

C. No combination gives this.

D. Working: T = 2π/ω = 2π/3.0 ≈ 2.09 s ≈ 2.1 s. Correct.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q130 Physics

A fighter plane is moving in a vertical circle of radius r. Its minimum velocity at the highest point of the circle will be ?

- A. √3gr
- B. √2gr
- C. √gr ✓ **Correct answer**
- D. √(gr/2)

A. The speed at the BOTTOM for minimum loop completion, not the top.

B. No such minimum-top value.

C. Working: at the top, $mg + N = mv^2/r$; minimum speed when $N = 0 \Rightarrow v^2/r = g \Rightarrow v = \sqrt{(gr)}$. Correct.

; the plane would fall out of the loop.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q131 Physics

Which of the following increase by increasing amplitude?

- A. Wavelength
- B. Frequently
- C. Zero
- D. Loudness ✓ **Correct answer**

A. Independent of amplitude (set by speed/frequency).

B. Frequency is independent of amplitude. (Option prints "Frequently" for frequency.)

C. Not a quantity that increases.

D. Intensity ∝ (amplitude)², so loudness rises with amplitude; correct.

Question Q132 Physics

An airplane travels at a speed of 0.5v where v is the speed of sound. The airplane approaches a stationary observer. The frequency of sound emitted by the aircraft is 200 Hz. Which frequency does the observer hear?

- A. 400 HZ ✓ **Correct answer**
- B. 100 HZ
- C. 120 Hz
- D. 180 Hz

A. Working: $f' = f \cdot v/(v - v_s) = 200 \times v/(v - 0.5v) = 200 \times 2 = 400$ Hz. Correct.

B. Would be a receding source at 0.5v ($f \cdot v/(v+v_s)$).

er combination gives this.

D. Close to the source frequency, not a 0.5v approach shift.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q133 Physics

If the wavelength of light coming from a galaxy shifts towards the red end of spectrum, then galaxy is:

- A. Approaching Earth
- B. Receding the Earth ✓ **Correct answer**
- C. Stationary
- D. Approaching Earth or is stationary

A. Approaching sources are blueshifted (shorter wavelength).

B. Redshift = wavelengths stretched = source moving away; correct.

C. No shift at all.

D. Neither produces a redshift.

Question Q134 Physics

The shortest distance between any two points in phase on a wave is called:

- A. Displacement
- B. Amplitude
- C. Wavelength ✓ **Correct answer**
- D. Frequency

A. Distance from equilibrium of a single point.

B. Maximum displacement.

between nearest in-phase points; correct.

D. Cycles per second, not a distance.

Question Q135 Physics

When will the oscillations stop in the absence of resistive forces?

- A. Never ✓ **Correct answer**
- B. After 10 minutes
- C. In 10 minutes
- D. Immediately

A. With no damping, energy is conserved and oscillation continues indefinitely (ideal case); correct.

B. Arbitrary times with no physical basis.

C. Arbitrary times with no physical basis.

D. Would need total energy loss at once.

Note: Explanations for options B/C share one grouped paragraph in the .md; the same text is shown under each.

Question Q136 Physics

The mechanical waves are not generated by:

- A. Electric and magnetic fields ✓ **Correct answer**
- B. Coil of springs
- C. Ropes
- D. Water

A. Generate ELECTROMAGNETIC waves, not mechanical waves; correct as the exception.

B. A spring supports longitudinal mechanical waves.

answerse mechanical waves.

D. Supports water waves (mechanical).

Question Q137 Physics

Reducing mass M of a suspending body to one fourth will change the frequency of oscillation to

- A. One fourth
- B. Double ✓ **Correct answer**
- C. Quadrupule
- D. Half

A. Would follow f ∝ m.

B. Working: f = (1/2π)√(k/m) ∝ 1/√m; m → m/4 ⇒ f → f/√(1/4) = 2f. Correct.

C. Would follow f ∝ 1/m.

D. Would follow f ∝ √m.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q138 Physics

A distant star is receding from the Earth with a speed of 1.40 x 10^7 m/s. It emits light of frequency 4.57 x 10^14 Hz. The speed of light is 3.0 x 10^8 m/s. The Doppler effect formula can be used with light waves. What will be the frequency of this light when detected on Earth?

- A. 2.04 x 10^13 Hz
- B. 4.37 x 10^14 Hz ✓ **Correct answer**
- C. 4.57 x 10^14 Hz
- D. 4.79 x 10^14 Hz

of magnitude too small.

B. Working: $v/c = 1.40\times10^{7}/3.0\times10^{8} \approx 0.0467$; $f' \approx f(1 - v/c) = 4.57\times10^{14} \times 0.9533 \approx 4.36\times10^{14}$ Hz $\approx 4.37\times10^{14}$ Hz (redshifted). Correct.

C. The emitted frequency: no shift.

D. Blueshifted (higher); wrong direction for a receding source.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q139 Physics

Thermodynamics is that branch of Physics in which we study

- A. relations between heat and mechanical energies ✓ **Correct answer**
- B. relations between heat and ionization energies
- C. relations between chemical and mechanical energies
- D. relations between kinetic and potential energies

A. Heat, work and energy conversion: the definition of thermodynamics; correct.

B. Ionisation energies belong to atomic physics.

C. Chemical/mechanical energy relations are not the definition.

D. Kinetic/potential energy relations belong to mechanics.

Question Q140 Physics

When a gas is compressed isothermally, the product of its pressure and volume during the process is:

- A. not constant
- B. constant ✓ **Correct answer**
- C. zero

A. False at constant T.

B. Working: isothermal ⇒ T constant ⇒ PV = nRT = constant (Boyle's law). Correct.

C. P and V are both positive.

D. Entropy changes during isothermal compression; PV does not track it.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q141 Physics

Temperature of given mass of a gas is changed from 150°C to 300°C during an isobaric process, volume of the gas will become:

- A. Half
- B. Double
- C. Remain same
- D. Less than double ✓ **Correct answer**

A. Volume increases, not halves.

B. True only if Celsius were absolute (150 → 300 doubles only in °C, not in kelvin).

C. Volume must change with temperature at constant pressure.

D. Working: isobaric $V \propto T(K)$: $T_1 = 423$ K, $T_2 = 573$ K; $V_2/V_1 = 573/423 \approx 1.35$, less than double. Correct.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Q142 Physics

A capacitor is charged with a battery and energy stored is U. After disconnecting battery another capacitor of same capacity is connected in parallel to the first capacitor. Then energy stored in each capacitor is

- A. U/2
- B. U/4 ✓ **Correct answer**
- C. 4U
- D. 2U

A. The printed key, but WRONG: this is the TOTAL energy remaining, not the energy in each capacitor.

B. Working: charge is conserved. Initial: charge Q, voltage V, $U = \frac{1}{2}QV = Q^2/(2C)$. After sharing with an identical uncharged capacitor: total capacitance 2C, voltage halves to V/2, charge on each = Q/2. Energy in EACH $= \frac{1}{2}C(V/2)^2 = (\frac{1}{4})(\frac{1}{2}CV^2) = U/4$. Total energy = 2 × U/4 = U/2 (half is lost as heat/spark). The physically correct energy stored in EACH capacitor; correct.

C. Impossible: energy cannot quadruple.

D. Impossible: energy cannot double on sharing. VERIFIED: Brainly + Vedantu + Allen — charge sharing: energy in EACH capacitor is U/4 (total U/2, half lost as heat/spark); the marked answer A confuses total with per-capacitor energy.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q143 Physics

What is the potential difference between two points in an electric field if it takes 600 J of energy to move a charge of 2 C between these two points?

- A. 1200 J

- C. 300 J ✓ **Correct answer**
- D. 0 J

A. That is W × q, not W/q.

B. No combination gives 800.

C. Working: V = W/q = 600 J / 2 C = 300 V. Correct VALUE; DEFECT: the option prints "J" where the unit must be volts (J/C).

D. Work was done, so the potential difference is non-zero.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q144 Physics

Gauss law cannot be used to find which of the following quantity?

- A. Electric field intensity
- B. Electric flux density
- C. Charge
- D. Permittivity ✓ **Correct answer**

A. Gauss's law (with symmetry) yields E.

B. D = εE follows directly from Gauss's law.

C. Enclosed charge follows from the flux.

D. A material property (ε) that Gauss's law USES; it cannot be found FROM the law; correct.

Question Q145 Physics

Which one of the following statements is true?

trostatic force obeys inverse square law while gravitational force does not

- B. both gravitational force and electrostatic force are repulsive in nature
- C. gravitational force is much weaker than electrostatic force ✓ **Correct answer**
- D. Both electrostatic force and gravitational force don't obey inverse square law

A. False: BOTH obey inverse-square laws.

B. False: gravity is always attractive; electrostatic force can attract or repel.

C. True: for elementary charges gravity is ~10^{36}–10^{40} times weaker; correct.

D. False: both obey inverse-square laws.

Question Q146 Physics

The Coulomb's constant k depends upon:

- A. nature of medium
- B. system of units
- C. types of charge
- D. nature of medium and system of units ✓ **Correct answer**

A. Incomplete: k = 1/(4πε), and ε depends on the medium, but the numerical value also depends on units.

B. Incomplete: the medium matters too.

C. k does not depend on which charges are involved.

D. Correct.

Question Q147 Physics

A charged particle is moving in a uniform electric field. For the motion of the particle due to the field, which quantity has a constant non-zero value?

- A. acceleration ✓ **Correct answer**

- C. rate of change of acceleration
- D. velocity

A. Working: F = qE = constant ⇒ a = qE/m = constant (non-zero if qE ≠ 0). Correct.

B. Grows with time.

C. Zero (acceleration is constant), and the stem asks for a non-zero constant.

D. Changes linearly with time.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q148 Physics

A capacitor of capacitance 'C' has a charge 'Q' and stored energy is 'w'. If the charge is increases to '2Q'. The stored energy will be:

- A. 2W
- B. 4W ✓ **Correct answer**
- C. W/4
- D. W/2

A. Linear scaling; wrong.

B. Working: $W = Q^2/(2C)$; doubling Q quadruples Q^2, so $W' = 4W$. Correct.

C. Inverse scaling.

D. Halving; wrong.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Q149 Physics

How much potential drop exist across closed switch?

- A. 0 V ✓ **Correct answer**
- B. 1V
- C. 2V
- D. 3V

A. An ideal closed switch has negligible resistance, so V = IR ≈ 0 across it; correct.

B. No basis: the drop depends on the circuit, and for an ideal switch it is zero.

C. No basis: the drop depends on the circuit, and for an ideal switch it is zero.

D. No basis: the drop depends on the circuit, and for an ideal switch it is zero.

Note: Explanations for options B/C/D share one grouped paragraph in the .md; the same text is shown under each.

Question Q150 Physics

A 3 V battery is connected in series with ammeter and 2 ohm resistance after short circuiting circuiting. What will be the reading of ammeter?

- A. 1 A
- B. 1.5 A ✓ **Correct answer**
- C. 5 A
- D. 6 A

A. Would need 3 Ω.

B. Working: I = V/R = 3 V / 2 Ω = 1.5 A (the ammeter is ideal; the "short circuiting" wording is garbled — the calculation uses the stated 2 Ω). Correct.

C. No combination gives 5.

ed 0.5 Ω. (Stem prints "circuiting circuiting".)

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q151 Physics

The resistance of a conductor does not depend on which of the following?

- A. area
- B. resistivity
- C. length
- D. mass ✓ **Correct answer**

A. R depends on it (inversely).

B. R depends on it (material).

C. R depends on it (directly).

D. Working: R = ρL/A. R does not depend directly on mass (mass follows from density × volume, but R is fixed by ρ, L, A); correct as the exception.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q152 Physics

Which of the following statement is NOT CORRECT about Kirchhoff's rule?

- A. Kirchhoff's current rule based upon the law of conservation of charge
- B. Wheatstone bridge is an application of Kirchhoff's rule
- C. Kirchhoff's rules are more suitable in AC circuits ✓ **Correct answer**
- D. Kirchhoff's voltage rule based upon the law of conservation of energy

A. Correct statement: current rule = charge conservation at a junction.

...e Wheatstone bridge is analysed with Kirchhoff's rules.

C. NOT correct: Kirchhoff's rules are the foundation of DC analysis (and apply to AC in phasor form); they are not "more suitable" in AC than DC; correct as the incorrect statement.

D. Correct statement: voltage rule = energy conservation around a loop.

Question Q153 Physics

What do the substances whose resistance decreases with increase in temperature have?

- A. high temperature coefficient
- B. negative temperature coefficient ✓ **Correct answer**
- C. positive temperature coefficient
- D. zero temperature coefficient

A. "High" does not state the sign.

B. R falls as T rises ⇒ $\alpha < 0$ (semiconductors, thermistors); correct.

C. R rises with T (metals).

D. R unchanged with T (e.g. manganin approximately).

Question Q154 Physics

A low voltage supply with an e.m.f. of 20 V and an internal resistance of 1.5 ohms is used to supply power to a heater of resistance 6.5 ohms in a fish tank. What is the power supplied to the water in the fish tank?

- A. 41 W ✓ **Correct answer**
- B. 50 W
- C. 53 W
- D. 62 W

total R = 6.5 + 1.5 = 8.0 Ω, I = 20/8 = 2.5 A; power in heater = I^2R = 6.25 × 6.5 = 40.625 W ≈ 41 W. Correct.

B. That is the total power (20 × 2.5), including internal-resistance loss.

C. No combination gives this.

D. No combination gives this.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q155 Physics

Electric forces change the magnitude and direction of velocity while magnetic forces change_____ of velocity

- A. Only Magnitude
- B. Only direction ✓ **Correct answer**
- C. Magnitude and direction
- D. Neither magnitude nor direction

A. Magnetic force does no work, so speed (magnitude) cannot change.

B. Magnetic force acts perpendicular to velocity, curving the path at constant speed; correct.

C. That is what electric forces can do.

D. Magnetic force does change the direction.

Question Q156 (printed 161) Physics

Q.161 Which surface has greater magnetic flux in same magnetic field, each has an area 1 m^2.

- A. a. Circular

ectangular

- C. c. Square
- D. d. Flux is independent of shape ✓ **Correct answer**

A. All have the same area (1 m^2) in the same field, so all have the same flux; no shape is greater.

B. All have the same area (1 m^2) in the same field, so all have the same flux; no shape is greater.

C. All have the same area (1 m^2) in the same field, so all have the same flux; no shape is greater.

D. Working: Φ = BA cosθ depends on field, area and orientation — not on shape. Correct: flux is independent of shape (for equal area/orientation). (Options carry "a./b./c./d." prefixes as printed; stem carries printed number Q.161.)

Note: Explanations for options A/B/C share one grouped paragraph in the .md; the same text is shown under each. The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q157 (printed 162) Physics

Q.162 The source of magnetic field is:

- A. a. An isolated magnetic pole
- B. b. Static electric charge
- C. c. Nonmagnetic substance
- D. d. Current loop ✓ **Correct answer**

A. Magnetic monopoles have never been observed.

B. Produces an electric field, not a magnetic field.

C. Produces no field.

harges/currents generate magnetic fields; correct.

Question Q158 (printed 163) Physics

Q.163 One meter long copper rod is moving with speed 20 m/sec in the magnetic field of strength 0.6 tesla. What is the value of induced emf ?

- A. a. 10 v
- B. b. 12 v ✓ **Correct answer**
- C. c. 14 v
- D. d. 16 v

A. Would need v ≈ 16.7 m/s.

B. Working: motional emf E = Bℓv = 0.6 × 1 × 20 = 12 V (perpendicular motion assumed, as the paper intends). Correct.

C. Would need v ≈ 23.3 m/s.

D. Would need v ≈ 26.7 m/s.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q159 (printed 164) Physics

Q.164 The unit of Δφ/Δt can be written as ?

- A. a. NmA^-2s^-1
- B. b. NmAs^-1
- C. c. NmA^-1s^-1 ✓ **Correct answer**
- D. d. NmA^-2s1

A. A^{-2}: wrong.

B. Missing the inverse on A (gives $N{\cdot}m{\cdot}A{\cdot}s^{-1}$).

ΔΦ/Δt has units Wb/s = volt = J/C = N·m·A^{-1}·s^{-1}. Correct dimensional form.

D. A^{-2} and s^{1}: wrong on both.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q160 (printed 165) Physics

Q.165 Working principal of magnetic levitation train is according to ?

- A. a. Faraday law
- B. b. Max planks law
- C. c. Ohm law
- D. d. Lenz law ✓ **Correct answer**

A. Describes induced emf magnitude; maglev's lift/guidance is framed via opposing induced currents.

B. Black-body radiation; unrelated.

C. V = IR; unrelated to levitation.

D. The keyed answer: induced currents oppose the change producing them, giving repulsive lift in electrodynamic maglev. Flagged: real maglev uses several principles (electromagnetic suspension/attraction as well as electrodynamic repulsion); Lenz's law is the paper's single-principle framing, not a complete account. VERIFIED (Wave-17 addendum, 2 Nov 2026): EngineerFix (according to Lenz's law, the induced currents create magnetic fields that oppose the moving magnet's field, generating a repulsive force) + Durofy (the induced field opposes its cause by Lenz's law; a repulsive force is produced and the train levitates). Caveat retained: real maglev systems also use electromagnetic-suspension (attraction) designs; Lenz's law is the paper's single-principle framing for the electrodynamic-repulsion type, which is what the stem asks for.

Q161 (printed 166) Physics

Q.166 A copper hoop is held in a vertical east-west plane in a uniform magnetic field whose field lines run along the north-south direction. The largest induced emf is produced when the hoop is ?

- A. a. Rotated about a north-south axis
- B. b. Rotated about an east-west axis ✓ **Correct answer**
- C. c. Moved rapidly, without rotation, toward the east
- D. d. Moved rapidly, without rotation, toward the south

A. The normal stays aligned with the field (rotation about the field direction); flux unchanged.

B. Working: flux $\Phi = BA\cos\theta$, θ = angle between field (N–S) and loop normal (initially N–S, in the plane's normal). Rotating about the E–W axis swings the normal away from the field, changing flux fastest. Flux changes maximally; correct.

C. In a UNIFORM field, translation does not change flux through the loop.

D. In a UNIFORM field, translation does not change flux through the loop.

Note: Explanations for options C/D share one grouped paragraph in the .md; the same text is shown under each. The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q162 (printed 167) Physics

Q.167 In transformer, there is no _____ connection between the two coils but they are _____ linked ?

- A. a. Magnetic, electrically
- B. b. Electrical, magnetically ✓ **Correct answer**
- C. c. Magnetic, magnetically
- D. d. Electrical, optically

B. No ELECTRICAL connection (no conducting path), but MAGNETICALLY linked via the core flux; correct.

C. "No magnetic connection" is false: the flux links them.

D. Optically linked is meaningless here.

Question Q163 (printed 168) Physics

Q.168 When the temperature of semiconductor suddenly drops to zero kelvin, then a semiconductor acts as:

- A. a. Conductor
- B. b. Semi-conductor
- C. c. Super conductor
- D. d. Insulator ✓ **Correct answer**

A. No free carriers at 0 K in an intrinsic semiconductor.

B. At 0 K it has no carriers to conduct with.

C. A different phenomenon (zero resistance in certain materials below Tc); not what happens to an ordinary semiconductor at 0 K.

D. Valence band full, conduction band empty, no thermal excitation; correct.

Question Q164 (printed 169) Physics

Q.169 If electron, proton, neutron, and alpha particle have same velocity, which of them has the shortest wavelength?

- A. a. Electron
- B. b. Proton
- C. c. Neutron

lpha particle ✓ **Correct answer**

A. Lightest: LONGEST wavelength.

B. Shorter than electron, longer than alpha.

C. ≈ proton mass: similar to proton.

D. Working: λ = h/(mv); at equal v, λ ∝ 1/m. Masses: electron ≪ proton ≈ neutron < alpha (≈4 nucleon masses). Heaviest: shortest wavelength; correct.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q165 (printed 170) Physics

Q.170 The process of ejection of loosely bound electrons from a certain photo sensitive surface by absorption of photon is called:

- A. a. Compton effect
- B. b. Photoelectric effect ✓ **Correct answer**
- C. c. Pair production
- D. d. Black body radiation

A. Photon scattering off electrons with wavelength shift.

B. Photon absorption ejects electrons from a surface; correct.

C. High-energy photon → electron + positron.

D. Thermal emission spectrum.

Question Q166 (printed 171) Physics

Q.171 In a photoelectric effect experiment, the stopping potential is:

- A. a. The kinetic energy of the most energetic electron ejected

- he potential energy of the most energetic electron ejected
- C. c. The photon energy
- D. d. The electric potential that causes the electron current to vanish ✓ **Correct answer**

A. That is eV_0 (the ENERGY), not the potential itself.

B. Potential energy is not the stopping potential.

C. Photon energy is hf, which exceeds the stopping energy by the work function.

D. The retarding potential that just stops the photocurrent; correct (eV_0 = K_max).

Question Q167 (printed 172) Physics

Q.172 The line spectrum of hydrogen atom contains the spectral lines in the region of:

- A. a. ultraviolet
- B. b. infrared
- C. c. visible
- D. d. all of these ✓ **Correct answer**

A. Lyman series only.

B. Paschen/Brackett/Pfund only.

C. Balmer only.

D. Hydrogen's series span UV (Lyman), visible (Balmer) and IR (Paschen etc.); correct.

Question Q168 (printed 173) Physics

Q.173 The speed of electron in the first Bohr orbit is:

- A. a. 2.19 x 10^6 ms^-1 ✓ **Correct answer**
- B. b. 2.19 x 10^-6 ms^-1
- C. c. 2.19x 10^4 ms^-1

.19 x 10^-4 ms^-1

A. Working: $v_1 = e^2/(2\varepsilon_0 h) \approx 2.18\times10^6$ m/s (≈ c/137). Correct.

B. Twelve orders too small.

C. A hundred times too small.

D. Ten orders too small.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q169 (printed 174) Physics

Q.174 A low energy neutron has RBE factor of 10. How much energy is absorbed by a man of mass 80 Kg if the value of equivalent dose is 400 rem?

- A. a. 16 J
- B. b. 32 J ✓ **Correct answer**
- C. c. 48 J
- D. d. 64 J

A. Would be 20 rad.

B. Working: absorbed dose = equivalent dose ÷ RBE = 400 rem ÷ 10 = 40 rad = 0.40 Gy = 0.40 J/kg; energy = 0.40 × 80 = 32 J. Correct.

C. Would be 60 rad.

D. Would be 80 rad.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Q170 (printed 175) Physics

Q.175 It has been observed that Thorium (_90^234)Th is transformed into Protactinium (_91^234)Pa after the emission of _____ particle:

- A. a. Alpha
- B. b. Beta ✓ **Correct answer**
- C. c. Gamma
- D. d. Alpha, Beta, Gamma

A. Would lower A by 4 and Z by 2.

B. Working: mass number unchanged (234), atomic number +1 (90 → 91): a neutron converts to a proton + electron. Correct.

C. Changes neither A nor Z.

D. No such combined emission is described.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q171 (printed 176) Physics

Q.176 The half-life of Strontium (Sr) is 8.70 hours. Its decay constant is:

- A. a. 0.000022 s
- B. b. 45000 /s
- C. c. 0.000022 / s ✓ **Correct answer**
- D. d. 0.000032 / s

A. Right number, wrong unit (seconds, not per second).

B. Absurdly large.

C. Working: $\lambda = \ln 2/t_{½} = 0.693/(8.70 \times 3600\ s) = 0.693/31320 \approx 2.21\times10^{-5}\ s^{-1} = 0.000022\ s^{-1}$. Correct value with correct units.

lue.

Note: The 'Working:' derivation that opens the .md explanation is prepended to the correct option's explanation (it is the derivation of the answer).

Question Q172 (printed 177) English

Q.177 Synonym of the word "Capricious" is:

- A. a. Fickle ✓ **Correct answer**
- B. b. Predictable
- C. c. Uniform
- D. d. Invariable

A. Changeable, unpredictable: the synonym of capricious; correct.

B. An antonym.

C. An antonym (unchanging).

D. An antonym (never varying).

Question Q173 (printed 178) English

Q.178 Diseases like diabetes are supposed to be taken seriously or they can be ..... Which of the following words will fill in the blank most appropriately?

- A. a. Cursing
- B. b. Healthy
- C. c. Fatal ✓ **Correct answer**
- D. d. Impersonating

A. Swearing; nonsensical here.

B. The opposite of the intended warning.

C. Untreated serious disease can cause death; correct.

g to be someone else, nonsensical.

Question Q175 (printed 180) English

Q.180 Fill in the blank with the correct word. The shepherd ploughed this mountain with cattle the first time it ..... ever ploughed.

- A. a. was
- B. b. was been
- C. c. had
- D. d. had been ✓ **Correct answer**

A. "Was ever ploughed" lacks the perfect aspect the sentence needs.

B. Ungrammatical.

C. "Had ever ploughed" is incomplete (needs the participle).

D. "Had been ... ploughed" (passive past perfect): the intended completion. Flagged: the stem as transcribed omits the past participle after the blank ("had been [?] ever ploughed"), so the question is defective as printed; D is recorded as the keyed completion. VERIFIED (sprint addendum, 5 Nov 2026): British Council LearnEnglish past perfect (past-perfect passive = had + been + past participle; "the first time" marks the earlier past event) + past-perfect passive structure (education.ab51.org). Caveats retained: the stem omits the participle after the blank, and A ("was") is grammatical in isolation.

Question Q176 (printed 181) English

Q.181 To give one some idea of Rabies' horrors, one ..... only read such descriptions as the following: spasms, restlessness, shudders at the least breath of air, an ardent thirst, convulsive movements, and fits of furious rage.

- A. a. needs ✓ **Correct answer**
- B. b. need
- C. c. needed

as needed

A. "One needs only read...": singular "one" takes singular "needs"; correct.

B. Plural verb with singular "one"; wrong agreement.

C. Past tense; the statement is general/present.

D. Perfect aspect changes the meaning and does not fit the idiom.

Question Q177 (printed 182) English

Q.182 By 2030, people ..... been reading the works of Charles Dickens for more than 190 years.

- A. a. had
- B. b. will
- C. c. have
- D. d. will have ✓ **Correct answer**

A. Past perfect; the time reference is future (2030).

B. "Will been reading" is ungrammatical.

C. "Have been reading" is present perfect; the sentence looks forward to 2030.

D. "Will have been reading": future perfect continuous, correct for a duration reaching a future point.

Question Q178 (printed 183) English

Q.183 Choose the most suitable/appropriate sentence out of the following:

- A. a. Penny did not let me to get my book.
- B. b. Penny was not leaving me to get my book.
- C. c. Penny did not let me get my book. ✓ **Correct answer**
- D. d. Penny had not left me get my book.

D get". "let" takes a bare infinitive; "to" is wrong.

B. "Was not leaving me to get": awkward/wrong construction for this meaning.

C. "Did not let me get": correct bare-infinitive construction; correct.

D. "Had not left me get": wrong verb and tense for the meaning.

Question Q179 (printed 184) English

Q.184 Which one of the following is correct?

- A. a. We visited, Istanbul, Turkey, and Kowloon, Hong Kong last summer.
- B. b. We visited: Istanbul, Turkey, and Kowloon, Hong Kong last summer.
- C. c. We visited Istanbul, Turkey, Kowloon, Hong Kong last summer.
- D. d. We visited Istanbul, Turkey, and Kowloon, Hong Kong last summer. ✓ **Correct answer**

A. Stray comma after "visited".

B. Colon after "visited" is wrong here.

C. Missing "and" before the second place; the list runs together.

D. Correctly punctuated list of two place-name pairs; correct.

Question Q180 (printed 185) English

Q.185 Which of the following sentences is correct?

- A. a. How could Sarah perswad her mum to stay out later?
- B. b. How could Sarah persuade her mum to stay out later? ✓ **Correct answer**
- C. c. How could Sarah persuad her mum to stay out later?
- D. d. How could Sarah parsuade her mum to stay out later?

A. Misspelling.

elling and grammar, correct.

C. Misspelling.

D. Misspelling.

Question Q181 (printed 186) English

Q.186 Choose the sentence with the correct use of article.

- A. a. Natasha can play a piano and a violin.
- B. b. Natasha can play the piano and the violin. ✓ **Correct answer**
- C. c. Natasha can play the piano and a violin.
- D. d. Natasha can play piano and violin.

A. "A piano/a violin" suggests one of several instruments, not the conventional playing-an-instrument form.

B. "The piano/the violin": the conventional definite-article form for instruments; correct.

C. Mixed articles; inconsistent with the convention.

D. Missing articles entirely; unidiomatic in this construction.

Question Q182 (printed 187) English

Q.187 Distribute the handouts _____ the candidates. The correct preposition to be filled in is:

- A. a. into
- B. b. among ✓ **Correct answer**
- C. c. in
- D. d. on

A. Implies movement inside something, not distribution to people.

B. Used for distributing to members of a group (three or more); correct.

e in the candidates" is meaningless.

D. "Distribute on" is not idiomatic here.

Question Q183 English

Choose the correct sentence:

- A. These scissors are very sharp ✓ **Correct answer**
- B. This scissors is very sharp
- C. This scissor is very sharp
- D. These scissor are very sharp

A. "Scissors" is a plural-form noun taking plural "these/are"; correct.

B. "This ... is" with plural "scissors": wrong agreement.

C. "Scissor" as a singular noun is non-standard.

D. "Scissor" is non-standard, despite the plural verb.

Question Q184 English

Identify the sentence, out of the following, that is error free:

- A. I do not enjoy being laughed at by other people ✓ **Correct answer**
- B. I did not enjoy laughing by other people
- C. I am not enjoying laughing by other people
- D. I do not enjoying being laughed at by other people

A. "Enjoy" + gerund "being laughed at": correct.

B. "Laughing by other people" is ungrammatical (wrong voice).

C. Same "laughing by" error.

D. "Do not enjoying": auxiliary + –ing form error.

Q185 English

Choose the sentence that is grammatically correct.

- A. We agreed that the play was rather boring so we felt bored ✓ **Correct answer**
- B. We agreed that the play was rather bored so we felt boring
- C. We agreed that the play was rather bore so we felt bores
- D. We agreed that the play was rather bores so we felt bored

A. "Boring" describes the play (causing boredom); "bored" describes people's feeling; correct pairing.

B. Swaps the participles: a play cannot "feel bored".

C. "Bore/bores" are verb/noun forms, not the adjectives needed.

D. "Bores" for the play is wrong.

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