SZABMU MDCAT 2022 (Federal / AJK / GB) — Solved Past Paper

Body: Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU) · **Post:** MDCAT (Medical & Dental College Admission Test), Federal / AJK / GB · **Year:** 2022 · **Questions:** 200 in the original paper — **195 solved and verified**, 5 excluded as defective · **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 2022 sitting.

Source note: RELABELED 11 Nov 2026: this paper was built as 'SZABMU MDCAT 2023' (37m) but IS the SZABMU MDCAT 2022 paper — 198/200 stems match the Scribd SZABMU 2022 paper (doc 643233995, exam Sunday 13 Nov 2022); the mdcatpapers.com transcription was mislabeled '2023'. The real SZABMU 2023 paper is built separately as 37ahq (paper_id szabmu-mdcat-2023-code-c). Questions, answers and explanations are unchanged from the 8 Nov 2026 build. Primary source: mdcatpapers.com transcription, 'SZABMU MDCAT 2023 Past Paper' (accessed 31 Oct 2026, re-fetched 8 Nov 2026 — 'All 197 questions', ends at Q197), transcribed word for word. The official PMDC MDCAT 2022 blueprint total is 200 MCQs (Biology 68, Chemistry 54, Physics 54, English 18, Logical Reasoning 6; 3.5 hours, no negative marking); the PLS Academy bank (labeled SZABMU 2023, same transcription lineage) also lists 197 questions, so Q198-Q200 are missing-as-excluded, NOT reconstructed. Every answer was checked by worked derivation or reference fact, independently of the transcription's marked answer. 8 Nov 2026 push (assistant decisions under the owner's 8 Nov 2026 delegation): all 21 SINGLE-SOURCE items promoted to VERIFIED (one source is FINAL under the owner's 8 Nov 2026 verification standard); Q1 decided pick-one B (Federal Textbook Board Grade 11 Biology + live page vs GauthMath C); Q125 corrected D -> A (Medix logical-reasoning compilation); Q58/Q118 printed keys corrected openly in the file (sprint addendum, 5 Nov 2026);

EFECTIVE-excluded (37be precedent). The UHS 2023 transcription lives in the separate file 37m2 — the two transcriptions are different papers as presented and were NEVER merged.

Question 1 Biology

Each granum consists of_____thylakoids:

- A. 40-60
- B. 25-50 ✓ **Correct answer**
- C. 50-70
- D. 100-200

A. A higher count than the textbook figure this paper uses; not the keyed range.

B. The figure given in the FSc-level textbooks this paper follows for thylakoids per granum; the keyed answer, resting on that convention only (other textbooks quote 10–100).

C. Overlaps the top of the keyed range but is not the textbook figure.

D. Far too many for one granum; a whole chloroplast holds of that order of thylakoids in total.

Note: PICK-ONE decided by the assistant under the owner's 8 Nov 2026 delegation: B (25-50) over the rival C (50-70). Evidence: Federal Textbook Board Grade 11 Biology (National Book Foundation, 2017): 'Each granum consists of 25-50 thylakoids'; the live mdcatpapers.com page re-fetched 8 Nov 2026 keys B with the same figure. GauthMath keys the exact stem C. See the 8 Nov 2026 batch addendum and the needs-owner list §5B-41.

Question 2 Biology

The terminal ends of chromosomes are called:

- A. Satellite

- C. Nucleolar organizers
- D. Telomeres ✓ **Correct answer**

A. A satellite is a small chromosomal segment separated by a secondary constriction, not the end itself.

B. The protein structure at the centromere where spindle fibres attach, in the middle region, not the end.

C. Chromosome regions that organise the nucleolus; they sit at constrictions, not at the termini.

D. The protective repetitive-DNA caps at both ends of a chromosome; correct.

Question 3 Biology

Which organelles would be more abundant in a secretory cell than non-secretory cells?

- A. Lysosomes
- B. Golgi complex ✓ **Correct answer**
- C. Vacuoles
- D. Centrioles

A. Digestive organelles; their numbers do not rise specifically for secretion.

B. Modifies, sorts and packages proteins/lipids into secretory vesicles, so secretory cells are rich in Golgi; correct.

C. Storage sacs, prominent in plant cells, not the hallmark of animal secretory cells.

D. Organise the spindle in division; unrelated to secretion.

Question 4 Biology

The structure which disappears during cell division is:

- B. Lysosome
- C. Nucleolus ✓ **Correct answer**
- D. Endoplasmic reticulum

A. Vacuoles persist through division (they may divide or reform); they do not characteristically disappear.

B. Lysosomes persist through division.

C. It disassembles in prophase as rRNA synthesis stops and the chromatin condenses, reforming in telophase; correct.

D. The ER fragments into vesicles but does not disappear as a structure.

Question 5 Biology

The enzyme ATP synthase is located on the membrane of:

- A. Nucleus
- B. Mitochondria ✓ **Correct answer**
- C. Lysosome
- D. Vacuole

A. The nuclear membrane carries pores and transport machinery, not ATP synthase.

B. ATP synthase sits in the inner mitochondrial membrane (and, in chloroplasts, the thylakoid membrane), using the proton gradient to make ATP; correct.

C. A digestive sac with an acid interior maintained by proton pumps, not ATP synthase.

D. A storage sac; no ATP synthase in its membrane.

Question 6 Biology

Intracellular digestion of food is done by the organelle:

- B. Lysosome ✓ **Correct answer**
- C. Golgi apparatus
- D. Ribosome

A. Vacuoles store material and, in some cells, hold food, but the digestion itself is lysosomal.

B. Contains acid hydrolases that digest macromolecules inside the cell; correct.

C. Modifies and packages, it does not digest.

D. Synthesises proteins; it digests nothing.

Question 7 Biology

Which axon would transmit an action potential most rapidly?

- A. 1mm diameter neuron lacking myelin
- B. 1mm diameter neuron with myelin
- C. 2mm diameter neuron lacking myelin
- D. 2mm diameter neuron with myelin ✓ **Correct answer**

A. Smallest diameter and no saltatory conduction: slowest of the four.

B. Myelin speeds conduction, but the small diameter limits it.

C. Larger diameter lowers internal resistance, but continuous conduction is slower than saltatory.

D. Both speed factors combine: largest diameter plus saltatory conduction; fastest; correct.

Question 8 Biology

Vasopressin is an example of:

- B. Catecholamine
- C. Peptide hormone ✓ **Correct answer**
- D. Glycoprotein

A. Steroids are lipid-derived (e.g. cortisol); vasopressin is not.

B. Adrenaline/noradrenaline are catecholamines (amino-acid derivatives with a catechol ring); vasopressin is not.

C. Vasopressin (ADH) is a 9-amino-acid peptide; correct.

D. A protein with sugar chains (e.g. FSH, TSH); vasopressin carries no sugar chain.

Question 9 Biology

Which function is not controlled by hypothalamus?

- A. Regulate hunger
- B. Regulate sleep
- C. Regulate water balance
- D. Storing long time memories ✓ **Correct answer**

A. Hypothalamic hunger/satiety centres control appetite; controlled.

B. The hypothalamus (suprachiasmatic nucleus and sleep centres) regulates sleep–wake cycles; controlled.

C. Via ADH release and thirst; controlled.

D. Long-term memory storage is cortical/hippocampal, not hypothalamic; correct as the exception.

Question 10 Biology

Posterior lobe of pituitary gland produces:

tocin ✓ **Correct answer**

- B. Thyroid Stimulating Hormone (TSH)
- C. Adreno Corticotropic Hormone (ACTH)
- D. Follicle Stimulating Hormone (FSH)

A. The posterior lobe's hormone (with vasopressin). DEFECT: strictly, oxytocin is SYNTHESISED in the hypothalamus and only stored/released by the posterior lobe; "produces" is loose, but oxytocin is the only posterior-lobe hormone listed.

B. An anterior pituitary hormone.

C. An anterior pituitary hormone.

D. An anterior pituitary hormone.

Question 11 Biology

In neurons, the message istransmitted across synapse in the form of chemical messenger called:

- A. Communication
- B. Neurotransmitter ✓ **Correct answer**
- C. Nerve impulse
- D. Noci receptors

A. A general word, not the name of the chemical messenger.

B. The chemical (e.g. acetylcholine) released into the synaptic cleft; correct.

C. The electrical signal travelling along the neuron, not the chemical crossing the gap.

D. Nociceptors are pain receptors; they are not the messenger. (Stem prints "istransmitted" for "is transmitted".)

12 Biology

Microscopic gap between the two neurons is called:

- A. Synapsis
- B. Synapse ✓ **Correct answer**
- C. Collapse
- D. Synaptic knob

A. The pairing of homologous chromosomes in meiosis; a different term.

B. The junction/gap across which one neuron signals the next; correct.

C. Unrelated.

D. The swollen presynaptic terminal (bouton) that releases transmitter, not the gap itself.

Question 13 Biology

In a reflex arc, the cell body of sensory neuron is located in:

- A. Ventral root ganglion
- B. Gray matter of spinal cord
- C. White matter of spinal cord
- D. Dorsal root ganglion ✓ **Correct answer**

A. Ventral roots carry motor fibres and have no such ganglion.

B. Contains interneuron and motor-neuron cell bodies, not the sensory cell body.

C. Tracts of axons, not cell bodies.

D. The swelling on the dorsal root housing sensory-neuron cell bodies; correct.

Question 14 Biology

The feelings and emotions of love and hate are controlled by:

/gdalae ✓ Correct answer

- B. Hippocampus
- C. Thalamus
- D. Hypothalamus

A. Limbic structures central to emotional processing, including fear, affection and aggression; correct as the keyed answer.

B. Mainly memory formation, not emotion itself.

C. Sensory relay station.

D. Regulates drives and hormones; it expresses emotions bodily but is not the seat of the feelings named.

Question 15 Biology

Which of the following is TRUE about Amoebae?

- A. They have flagella
- B. They are multicellular
- C. They do not cause any disease in humans
- D. They move by forming specialized cytoplasmic projections called pseudopodia ✓ **Correct answer**

A. Amoebae move without flagella (flagellates are a different group).

B. Amoebae are single-celled.

C. False: e.g. Entamoeba histolytica causes amoebic dysentery.

D. Temporary cytoplasmic extensions used for movement and feeding; correct.

Question 17 Biology

The catalytic activity of an enzyme is restricted to its small portion:

ve site ✓ **Correct answer**

- B. Passive site
- C. Allosteric site
- D. Regulation site

A. The pocket where substrate binds and catalysis happens; correct.

B. No such standard site.

C. A regulatory binding site elsewhere on the enzyme; it modulates activity but does not catalyse.

D. A vague synonym for the allosteric/regulatory site, not the catalytic site.

Question 18 Biology

The maximum enzymatic activity of trypsin is shown at:

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

A. Stomach acidity; pepsin's optimum, not trypsin's.

B. Still acidic; trypsin activity is low here.

C. Below trypsin's optimum.

D. Trypsin, a pancreatic protease, works in the slightly alkaline small intestine, optimum ≈ pH 7.5–8.5; correct.

Question 19 Biology

Most enzyme have an optimum temperature of around:

- A. 30 O C

- O C ✓ **Correct answer**
- C. 50 O C
- D. 20 O C

A. Below the usual human-enzyme optimum.

B. The keyed textbook figure (optimum quoted as ≈35–40 °C for human enzymes); closest listed value above body temperature 37 °C. Flagged because the physiological optimum is 37 °C itself, which is not offered, so the answer rests on the textbook's rounded convention.

C. High enough to denature most human enzymes.

D. Far below the optimum; activity would be slow.

Question 20 Biology

Enzyme work by lowering the of the reaction they catalyze:

- A. Kinetic energy
- B. Activation energy ✓ **Correct answer**
- C. Heat energy
- D. Potential energy

A. Enzymes do not lower the reactants' kinetic energy.

B. Enzymes stabilise the transition state, lowering the activation-energy barrier; correct. (The stem omits "activation energy" after "the".)

C. Heat is not the barrier enzymes lower.

D. Enzymes do not change the overall potential-energy difference between reactants and products.

21 Biology

In terms of enzyme action, maximum temperature refers to a temperature at which:

- A. Enzyme start to denature ✓ **Correct answer**
- B. Enzyme start to re-nature
- C. Enzyme work best
- D. Enzyme are reactivated

A. The keyed meaning: beyond the maximum temperature the enzyme's structure breaks down and activity falls; correct as the paper's convention.

B. Renaturation is refolding after denaturation, not what the maximum temperature marks.

C. That is the OPTIMUM temperature, lower than the denaturing point.

D. Heating past the maximum does not reactivate enzymes. Flagged: "maximum temperature" is a loose textbook term, not a standard kinetic definition.

Question 22 Biology

_____ reduces the enzyme activity by blocking the substrate from entering the active site due to similar shapes:

- A. Competitive inhibitors ✓ **Correct answer**
- B. Non-competitive inhibitors
- C. Co-enzymes
- D. Activators

A. Resemble the substrate, compete for the active site, and block it; correct.

B. Bind elsewhere (allosteric site) and change the enzyme's shape; they do not block the active site by resemblance.

C. Organic helpers that assist enzymes; they increase, not reduce, activity.

enzyme activity, the opposite effect.

Question 23 Biology

He presented the theory of origin of species by means of natural selection:

- A. Lamarck
- B. Linnaeus
- C. Hardy-Weinberg
- D. Darwin ✓ **Correct answer**

A. Proposed inheritance of acquired characteristics, not natural selection.

B. The classification (binomial) system, not evolution by selection.

C. A principle of population-genetics equilibrium, not a theory of speciation.

D. Charles Darwin, On the Origin of Species (1859), natural selection; correct.

Question 24 Biology

Among the oldest known fossils comes the:

- A. Prokaryotes ✓ **Correct answer**
- B. Amphibians
- C. Reptiles
- D. Fishes

A. The oldest fossils are microbial (stromatolites, ~3.5 billion years old); correct.

B. Appear hundreds of millions of years ago, far later.

C. Later still than amphibians.

D. The earliest vertebrates, but vastly younger than prokaryotic fossils.

25 Biology

What is the contribution of hormone cholecystokinin?

- A. Facilitates bile release from gall bladder ✓ **Correct answer**
- B. Mucus release from stomach
- C. Production of bile from liver
- D. Gastric juice release from stomach

A. CCK contracts the gall bladder and relaxes the sphincter of Oddi, releasing bile into the duodenum; correct.

B. Gastric mucus is not CCK's action.

C. The liver makes bile continuously; CCK does not drive its production.

D. Gastrin, not CCK, is the main hormonal stimulus there.

Question 26 Biology

Which of the following is not a component of bile?

- A. Digestive enzymes ✓ **Correct answer**
- B. Salts
- C. Mucus
- D. Lecithin

A. Bile contains no enzymes; it emulsifies fat but does not digest it chemically; correct as the exception.

B. Bile salts are a major component.

C. Mucin is present in bile.

D. A phospholipid present in bile.

27 Biology

The first chemical digestion of proteins takes place in the:

- A. Mouth
- B. Esophagus
- C. Stomach ✓ **Correct answer**
- D. Intestine

A. Only mechanical chewing and salivary amylase (carbohydrate) act here; no protein digestion.

B. A transport tube; no digestion.

C. Pepsin, activated by HCl, begins chemical protein digestion; correct.

D. Protein digestion CONTINUES here (trypsin etc.), but it does not begin here.

Question 28 Biology

Select the duration of cardiac cycle:

- A. 0.6 sec
- B. 0.4 sec
- C. 0.7sec
- D. 0.8 sec ✓ **Correct answer**

A. Working: at a resting heart rate of ≈75 beats/min, one cycle = 60 ÷ 75 = 0.8 s. Would correspond to 100 beats/min.

B. Would correspond to 150 beats/min.

C. Would correspond to ≈86 beats/min, not the standard resting figure.

D. The standard resting cardiac-cycle duration; correct.

29 Biology

Select the hormone which increases the activity of parietal and chief cells:

- A. Cholecystokinin
- B. Secretin
- C. Gastrin ✓ **Correct answer**
- D. Acetylcholine

A. Acts mainly on gall bladder and pancreas.

B. Stimulates pancreatic bicarbonate; not the parietal/chief-cell hormone.

C. Stimulates parietal cells (HCl) and chief cells (pepsinogen); correct — and it is a hormone, as the stem asks.

D. Also stimulates these cells, but it is a neurotransmitter, not a hormone, so it fails the stem's own condition.

Question 30 Biology

The pathways of water transport in which water moves through plasmodesmata is:

- A. Apoplast
- B. Symplast ✓ **Correct answer**
- C. Vacuolar
- D. Ascent of sap

A. Water moves through cell walls and intercellular spaces, NOT through plasmodesmata.

B. Water moves cell-to-cell through the cytoplasm via plasmodesmata; correct.

C. Water passes through vacuoles (tonoplast) — a third route, not the plasmodesmatal one.

D. The overall upward movement in xylem, not a named cellular pathway.

31 Biology

Enzyme trypsinogen is activated by:

- A. HCL
- B. Pepsin
- C. Enterokinase ✓ **Correct answer**
- D. Erypsin

A. Activates pepsinogen in the stomach, not trypsinogen.

B. A gastric protease; it does not activate trypsinogen.

C. Enteropeptidase of the intestinal brush border cleaves trypsinogen to trypsin; correct.

D. Erepsin is a mixture of intestinal peptidases; it does not activate trypsinogen.

Question 32 Biology

Emulsification of large fat globules is facilitated by:

- A. Lipase
- B. Bile salts ✓ **Correct answer**
- C. Trypsin
- D. Chymotrypsin

A. Digests emulsified fat; it does not emulsify it.

B. Amphipathic molecules that break large globules into small droplets, increasing surface area; correct.

C. A protease; it acts on proteins, not fat globules.

D. A protease; likewise irrelevant to fat emulsification.

33 Biology

The area between the two lungs is called:

- A. Periosteum
- B. Infundibulum
- C. Mediastinum ✓ **Correct answer**
- D. Hilum

A. The membrane covering bones.

B. A funnel-shaped structure (e.g. of the hypothalamus or fallopian tube).

C. The central chest compartment between the lungs containing heart, great vessels, trachea and oesophagus; correct.

D. The root region of a lung where bronchi/vessels enter, not the space between the lungs.

Question 34 Biology

In human heart, the left atrium receives:

- A. The Superior Vena Cava
- B. The Inferior Vena Cava
- C. The Coronary Sinus
- D. The four Pulmonary Veins ✓ **Correct answer**

A. Drains into the RIGHT atrium.

B. Drains into the RIGHT atrium.

C. Drains heart-vein blood into the RIGHT atrium.

D. Carry oxygenated blood from the lungs into the LEFT atrium; correct.

35 Biology

All viruses are:

- A. Autotrophs
- B. Heterotrophs
- C. Parasites ✓ **Correct answer**
- D. Predators

A. Make their own food; viruses make nothing.

B. Feed on organic matter; viruses do not feed at all.

C. Obligate intracellular parasites: they must use a host cell's machinery to replicate; correct.

D. Hunt and consume prey; viruses do not.

Question 36 Biology

Which of the following is transmitted through infected blood and hypothermal syringes?

- A. HIV ✓ **Correct answer**
- B. Influenza Virus
- C. Morbilli Virus (Measles)
- D. Vibrio Virus (Cholera)

A. Transmitted by infected blood and shared/contaminated syringes (and sexually, mother-to-child); correct.

B. Respiratory droplet transmission, not blood/syringes.

C. Airborne/respiratory transmission.

D. DEFECTS: cholera is caused by the BACTERIUM Vibrio cholerae, not a virus, and spreads via contaminated water/food, not blood. (Stem prints "hypothermal" for hypodermic.)

37 Biology

Light independent phase of photosynthesis involves:

- A. Formation of energy rich carbohydrates ✓ **Correct answer**
- B. Hydrolysis of water
- C. ATP generation
- D. Production of reducing molecules

A. The Calvin cycle fixes CO_2 into triose phosphates/carbohydrates using ATP and NADPH; correct.

B. Photolysis of water belongs to the light-dependent reactions.

C. Photophosphorylation belongs to the light-dependent reactions.

D. NADPH is produced in the light-dependent reactions (it is CONSUMED in the Calvin cycle).

Question 38 Biology

The element whose electrons are excited during light reaction of photosynthesis is:

- A. Carbon
- B. Hydrogen
- C. Magnesium ✓ **Correct answer**
- D. Nitrogen

A. Carbon is fixed in the Calvin cycle; its electrons are not the ones excited in the light reactions.

B. Hydrogen atoms/protons move in the gradient, but excitation is in the pigment.

C. The keyed answer: Mg^{2+} sits at the centre of the chlorophyll porphyrin ring, and the pigment's excited electrons are associated with that Mg-centred complex. Flagged: strictly, it is the chlorophyll molecule's π-electrons that are excited, not magnesium's own

the wording is loose and the answer rests on the textbook convention.

D. Present in the porphyrin ring, but not the named centre of excitation.

Question 39 Biology

Select an example of fibrous protein:

- A. Enzymes
- B. Collagen ✓ **Correct answer**
- C. Hemoglobin
- D. Hormones

A. Almost all globular proteins.

B. A long, rope-like structural fibrous protein of connective tissue; correct.

C. A globular transport protein.

D. Protein hormones (e.g. insulin) are globular, not fibrous.

Question 40 Biology

Which function is NOT performed by proteins?

- A. Providing structural support to cell
- B. Catalyzing biochemical reactions
- C. Transporting materials across cell membrane
- D. Providing insulation against heat loss ✓ **Correct answer**

A. Proteins do this (cytoskeleton, collagen).

B. Enzymes are proteins.

C. Channel/carrier proteins and haemoglobin do this.

D. That is the job of adipose tissue/lipids, not proteins as such; correct as the exception.

41 Biology

Three hydrophobic fatty acid tails and a glycerol molecule join to form a:

- A. Monoglyceride
- B. Diglyceride
- C. Triglyceride ✓ **Correct answer**
- D. Phospholipid

A. One fatty acid on glycerol.

B. Two fatty acids on glycerol.

C. Three fatty acids esterified to one glycerol; correct.

D. Two fatty acids plus a phosphate head group, not three fatty-acid tails.

Question 42 Biology

Which bond is the potential source of chemical energy for cellular activities?

- A. C=O
- B. C-H ✓ **Correct answer**
- C. C-R
- D. C-N

A. The product bond in CO_2; forming it releases energy, but it is not the stored-energy bond of fuels.

B. The keyed answer: oxidation of C–H bonds in fuels releases the energy cells capture; correct as the textbook convention. Flagged: energy is a property of the whole oxidation reaction, not of one bond in isolation.

C. A generic carbon–substituent bond, not a named energy store.

D. A bond in amines/amides, not the principal fuel bond.

43 Biology

Which property of water enables it to act as temperature stabilizer in living organisms?

- A. High polarity
- B. Being non polar
- C. High specific heat capacity ✓ **Correct answer**
- D. High heat of vaporization

A. Polarity explains water's solvent power, not directly its temperature buffering.

B. Water is polar; this option is false.

C. Water absorbs/releases much heat with little temperature change, stabilising body temperature; correct.

D. This cools by evaporation (sweating), a different mechanism from buffering temperature change itself.

Question 44 Biology

Which molecules do not contribute to the formation of biological membranes?

- A. Glycoproteins
- B. Glycolipids
- C. Phospholipids
- D. Nucleoproteins ✓ **Correct answer**

A. Membrane proteins with sugar chains; they are membrane components.

B. Lipids with sugar chains in the membrane.

C. The bilayer-forming molecules of the membrane.

D. DNA/RNA–protein complexes of the nucleus; they form no part of membranes; correct.

45 Biology

Which of the following carbohydrates are sweetest among all?

- A. Monosaccharides ✓ **Correct answer**
- B. Disaccharides
- C. Oligosaccharides
- D. Polysaccharides

A. Simple sugars; fructose, a monosaccharide, is the sweetest common sugar, and as a class monosaccharides taste sweeter than larger carbohydrates; correct.

B. Sweet (sucrose), but generally less sweet per unit than fructose.

C. Only mildly sweet.

D. Starch etc. are essentially tasteless.

Question 46 Biology

Which organelles of animal cells are called suicidal bags?

- A. Peroxisomes
- B. Glyoxisomes
- C. Lysosomes ✓ **Correct answer**
- D. Food Vacuoles

A. Oxidative organelles (H_2O_2 metabolism); not suicidal bags.

B. Plant organelles of the glyoxylate cycle; absent from animal cells.

C. Their released hydrolases can digest the cell itself, hence "suicidal bags"; correct.

D. Hold ingested material; they do not earn that name.

47 Biology

Chemically, cell wall of fungi is made up of:

- A. Cellulose
- B. Lignin
- C. Chitin ✓ **Correct answer**
- D. Murein

A. Plant cell walls.

B. Woody plant tissue.

C. A polymer of N-acetylglucosamine, the main fungal wall material; correct.

D. Peptidoglycan, the bacterial wall material.

Question 48 Biology

The organelle which provides neurotransmitters in the nervous pathway is:

- A. Glyoxisome
- B. Peroxisome
- C. Golgi apparatus ✓ **Correct answer**
- D. Endoplasmic reticulum

A. A plant peroxisome variant; no role in neurotransmitters.

B. Oxidative metabolism; not a transmitter packager.

C. Processes and packages secretory vesicles, including synaptic vesicles carrying neurotransmitters; the keyed answer. Flagged: neurotransmitters themselves are synthesised in the cytoplasm/terminals, and the Golgi packages them — "provides" is loose.

D. Synthesises proteins/lipids but does not package transmitter vesicles.

49 Biology

The inner membrane of the mitochondria is folded to form finger like:

- A. Cisternae
- B. Cristae ✓ **Correct answer**
- C. Chromatin
- D. Chloroplast

A. Flattened sacs of Golgi/ER, not mitochondrial folds.

B. The folds of the inner mitochondrial membrane, increasing surface area for respiration; correct.

C. DNA–protein material of the nucleus.

D. A different organelle entirely.

Question 50 Biology

Adenylate cyclase, in the cell membrane acts as:

- A. Channel protein
- B. Carrier protein
- C. Enzyme ✓ **Correct answer**
- D. Receptor

A. Forms a pore for ions; adenylyl cyclase forms no pore.

B. Transports a substance across the membrane; adenylyl cyclase transports nothing.

C. It catalyses ATP → cyclic AMP, a second messenger; correct.

D. It is activated via G-protein-coupled receptors, but it is itself the effector enzyme, not the receptor.

51 Biology

Glycogen, lipid droplets form the most important_____of the cell.

- A. Cell organelles
- B. Cell inclusions ✓ **Correct answer**
- C. Cytoplasmic matrix
- D. Non membranous organelles

A. Organelles are functional structures (mitochondria etc.); stored glycogen/lipid are not organelles.

B. Stored, non-living cytoplasmic deposits such as glycogen granules and lipid droplets; correct.

C. The cytosol fluid itself, not the stored deposits in it.

D. Structures like ribosomes/centrioles, which have functions; inclusions have none.

Question 52 Biology

Vaccination is an example of:

- A. Natural passive immunity
- B. Natural active immunity
- C. Acquired/Artificial active immunity ✓ **Correct answer**
- D. Acquired/Artificial passive immunity

A. Antibodies passed naturally (e.g. mother's milk); no vaccine involved.

B. Immunity after natural infection.

C. A vaccine deliberately introduces antigen so the body makes its own antibodies; correct.

D. Ready-made antibodies injected (e.g. antiserum); the recipient makes nothing.

53 Biology

Lymphatic system contains all of the following organs / structures except:

- A. Lymphoid masses
- B. Lymph vessels
- C. Spleen
- D. Lungs ✓ **Correct answer**

A. Tonsils etc. belong to the lymphatic system.

B. The system's own vessels.

C. A major lymphoid organ.

D. Respiratory organs, not part of the lymphatic system; correct as the exception.

Question 54 Biology

The unique macro-molecule in the bacterial cell wall is:

- A. Polysaccharides
- B. Proteins
- C. Peptidoglycan ✓ **Correct answer**
- D. Cholesterol

A. Present in many walls, but not the unique bacterial polymer.

B. Present in walls generally; not the defining molecule.

C. Murein, the sugar–peptide mesh found in bacterial walls and nowhere else; correct.

D. A eukaryotic membrane sterol, absent from bacterial walls.

Question 55 Biology

Transfer of genetic material from one bacterium to another through a third party usually

ge is called.

- A. Conjugation
- B. Transformation
- C. Transduction ✓ **Correct answer**
- D. Transportation

A. Direct cell-to-cell transfer via a pilus, no phage involved.

B. Uptake of free DNA from the surroundings.

C. A bacteriophage carries bacterial DNA from one host to another; correct.

D. Not a genetic-transfer term.

Question 56 Biology

All of the following are physical methods to control bacteria except:

- A. Sterilization
- B. Boiling
- C. Radiation
- D. Antiseptics ✓ **Correct answer**

A. A physical method (heat, filtration).

B. Physical (heat).

C. Physical (UV, gamma).

D. CHEMICAL agents applied to living tissue; correct as the exception.

Question 57 Biology

Which of the following helps in developing immunity against germs?

- A. Radiotherapy

motherapy

- C. Vaccines ✓ **Correct answer**
- D. Antibiotics

A. Cancer treatment with radiation; builds no immunity.

B. Drug treatment of cancer; builds no immunity.

C. Train the immune system to recognise germs, developing active immunity; correct.

D. Kill bacteria during an infection; they do not develop immunity.

Question 58 Biology

After fertilization, zygote takes_____for its journey from fallopian tube to uterus:

- A. 6-7 days
- B. 3-6 days ✓ **Correct answer**
- C. 10-12 days
- D. 12-15 days

A. The printed key, but WRONG for the journey: 6–7 days is the time to IMPLANTATION (blastocyst implants ≈6–7 days after fertilisation), not the tubal journey.

B. The embryo reaches the uterine cavity in ≈3–5 days, so the tubal journey itself falls inside this range; correct.

C. Too long for either the journey or implantation.

D. Far too long. VERIFIED: embryology.ch + Testbook — the zygote's journey from fallopian tube to uterus takes 3–6 days (the embryo reaches the uterine cavity in ≈3–5 days); 6–7 days is implantation timing, not the journey.

Note: FILE CORRECTION: the printed key A (6-7 days) is WRONG for the journey — 6-7 days is implantation timing. Corrected openly to B (3-6 days) on embryology.ch + Testbook (the embryo reaches the uterine cavity in about 3-5 days). See the 5 Nov 2026 sprint

Question 59 Biology

The best temperature forspermatogenesis is:

- A. 37 O C
- B. 30 O C
- C. 32 O C
- D. 35 O C ✓ **Correct answer**

A. Core body temperature; spermatogenesis is impaired at this temperature, which is why the testes sit outside the body.

B. Too cool; below the scrotal range.

C. Within some quoted scrotal ranges (2–4 °C below core), but lower than the keyed figure.

D. The keyed figure: scrotal temperature ≈2 °C below core (≈35 °C). Flagged because textbooks quote 32–35 °C, so the answer rests on which figure the paper uses. (Stem prints "forspermatogenesis".)

Question 60 Biology

In human females, FSH stimulates:

- A. Follicle development ✓ **Correct answer**
- B. Ovulation
- C. Embryo implantation
- D. Menstruation

A. FSH grows and matures the ovarian follicle; correct.

B. Triggered mainly by the LH surge.

C. Driven by progesterone/oestrogen-primed endometrium, not FSH.

hormone withdrawal, FSH does not stimulate it.

Question 61 Biology

Leydig cells in testes are responsible for:

- A. Testosterone production ✓ **Correct answer**
- B. FSH production
- C. Sperm production
- D. Testosterone inhibition

A. Interstitial (Leydig) cells secrete testosterone under LH stimulation; correct.

B. FSH is made by the anterior pituitary.

C. Spermatogenesis occurs in the seminiferous tubules (Sertoli-supported), not in Leydig cells.

D. Leydig cells produce testosterone; they do not inhibit it.

Question 62 Biology

The muscle contraction involve the breakdown of cross bridges of active myosin filaments due to the following process:

- A. ATP is oxidized
- B. ATP is reduced
- C. ATP is hydrolyzed ✓ **Correct answer**
- D. ATP is synthesized

A. ATP is not oxidised in the cross-bridge cycle.

B. ATP is not reduced here.

C. ATP hydrolysis (ATP → ADP + Pi) powers myosin-head detachment and re-cocking; correct.

de in respiration, not in the contraction step itself.

Question 63 Biology

_____ is the inflammation of joints:

- A. Osteoarthritis ✓ **Correct answer**
- B. Osteoporosis
- C. Arteriosclerosis
- D. Osteosclerosis

A. The keyed answer: the degenerative joint disease in which cartilage breaks down and the joint becomes inflamed/painful. Flagged: strictly, osteoarthritis is degenerative with secondary inflammation; "arthritis" in general is joint inflammation, and no plain "arthritis" option is offered.

B. Loss of bone density; a bone disease, not joint inflammation.

C. Hardening of arteries; unrelated to joints.

D. Abnormal hardening of bone; not joint inflammation.

Question 64 Biology

Tetany is caused by _____ in blood.

- A. Low Ca++ ✓ **Correct answer**
- B. High Ca++
- C. Low Mg++
- D. High Mg++

A. Hypocalcaemia raises nerve/muscle excitability, causing tetanic spasms; correct.

B. Hypercalcaemia causes weakness/constipation, not tetany.

C. Hypomagnesaemia can contribute, but the classic textbook cause named is low

D. Causes muscle weakness/depression, not tetany.

Question 65 Biology

What is the function of myoglobin?

- A. Store oxygen ✓ **Correct answer**
- B. Store CO2
- C. Transport oxygen
- D. Transport CO2

A. Myoglobin in muscle binds O_2 and releases it during heavy demand; correct.

B. No such role.

C. That is haemoglobin's job in blood.

D. Done mainly by blood plasma/haemoglobin, not myoglobin.

Question 66 Biology

A joint in which ends of bones are covered with hyaline cartilage and held together by surrounding tube like capsule of dense fibrous tissue:

- A. Cartilaginous Joint
- B. Synovial Joint ✓ **Correct answer**
- C. Fibrous Joint
- D. Immoveable Joint

A. Bones joined by cartilage with no joint cavity or capsule.

B. Hyaline cartilage on the bone ends + fibrous capsule + synovial cavity; correct.

C. Bones joined by dense fibrous tissue with no cartilage-covered cavity.

ion of movement (e.g. sutures), not this structure.

Question 67 Biology

These are the genes which tend to be inherited together and do not assort independently:

- A. Linked genes ✓ **Correct answer**
- B. Dependent genes
- C. Recombinant genes
- D. Independent genes

A. Genes close together on the same chromosome, inherited together because crossing-over between them is rare; correct.

B. Not a standard genetics term.

C. Genes that HAVE been separated by crossing-over; the opposite pattern.

D. Genes on different chromosomes (or far apart) that assort independently; the opposite.

Question 68 Biology

Mendelian inheritance follows which form of dominance relation?

- A. Complete dominance ✓ **Correct answer**
- B. Incomplete dominance
- C. Co-dominance
- D. Multiple allelic dominance

A. The classic Mendelian pattern: the heterozygote shows only the dominant allele's trait; correct.

B. A blended heterozygote phenotype; a non-Mendelian modification.

C. Both alleles expressed (e.g. AB blood group); a modification, not classic Mendel.

minance relation, multiple alleles (e.g. ABO) is a different concept.

Question 69 Physics

The unit of kinetic energy is same as that of:

- A. Work ✓ **Correct answer**
- B. Power / Time
- C. Time / Power
- D. Work / Time

A. Working: kinetic energy = ½mv², units kg·m²·s⁻² = joule. Work = force × distance, also joule; correct.

B. (J/s)/s = J/s², not energy.

C. s²/J, not energy.

D. That is power (watt), not energy.

Question 70 Physics

Which one provides centripetal force in a circular motion of a body?

- A. Vertical component of weight
- B. Horizontal component of weight
- C. Weight of the body
- D. Force of friction ✓ **Correct answer**

A. Weight acts vertically; it cannot supply a horizontal centre-seeking force.

B. Weight has no horizontal component on level ground.

C. Acts downward; it supplies centripetal force only in special cases (e.g. a satellite, a banked track's component).

D. The keyed answer for a body (e.g. a car) circling on a level surface: friction points to the

jed. the stem states no situation, so the answer holds only for the assumed level-road case.

Question 71 Physics

How many radians are in one degree?

- A. 0.0174 rad ✓ **Correct answer**
- B. 0.174 rad
- C. 1.745 rad
- D. 0.00174 rad

A. Working: 1° = π/180 rad = 3.1416/180 ≈ 0.01745 rad. Correct (rounded).

B. Ten times too large (≈10°).

C. One hundred times too large (≈100°).

D. Ten times too small (≈0.1°).

Question 72 Physics

Which one of the following is the angular velocity of an electric motor if it rotates at 400 rpm?

- A. 51.2 rad/s
- B. 41.9 rad/s ✓ **Correct answer**
- C. 45.2 rad/s
- D. 38.5 rad/s

A. Working: ω = 2πN/60 = 2π × 400/60 = 2π × 6.667 ≈ 41.89 rad/s. Would need ≈489 rpm.

B. Correct.

C. Would need ≈432 rpm.

D. Would need ≈368 rpm.

73 Physics

The tension is string at top of vertical circle is:

- A. Zero ✓ **Correct answer**
- B. mg
- C. 2mg
- D. 3mg

A. Working: at the top, T + mg = mv^2/r. At the MINIMUM speed that just completes the circle, $mv^2/r = mg$, so T = 0. Correct only at that minimum speed; the stem does not state it, so the answer rests on that unstated assumption.

B. Would give $mv^2/r = 2mg$ (a faster circle).

C. Would give $mv^2/r = 3mg$.

D. Would give $mv^2/r = 4mg$. At higher speeds tension is positive, so A is conditional, not general.

Question 74 Physics

The centripetal force in terms of angular velocity is given by:

- A. F c = m r ω
- B. F c = m r ω^2 ✓ **Correct answer**
- C. F c = m r α^2
- D. F c = m r α

A. Dimensions: $kg{\cdot}m{\cdot}s^{-1}$ (momentum), not force.

B. Since $v = r\omega$, $F = mv^2/r = mr\omega^2$; correct.

C. α is angular acceleration; α^2 gives the wrong dimensions and meaning.

D. That is m × tangential acceleration (tangential force), not centripetal force.

75 Physics

Which one of the following is angular speed in radian per hour for daily rotation of our earth?

- A. 2 π
- B. 4 π
- C. π /6
- D. π /12 ✓ **Correct answer**

A. Working: ω = 2π radians / 24 h = π/12 rad/h. One full turn per hour, 24× too fast.

B. 48× too fast.

C. One turn per 12 h, twice too fast.

D. Correct.

Question 76 Physics

Wavelength of wave is defined as:

- A. Distance between two consecutive crests ✓ **Correct answer**
- B. Distance between two alternate crest
- C. Distance between two alternate trough
- D. Distance between two crest and two trough

A. The distance between two successive points in identical phase; correct.

B. That distance is 2λ, not λ.

C. Also 2λ.

D. A meaningless interval, not a wavelength.

77 Physics

Which of the following factor does not affect the speed of sound in air?

- A. Pressure ✓ **Correct answer**
- B. Density
- C. Temperature
- D. Medium

A. Working: v = √(γP/ρ); for an ideal gas P/ρ = RT/M, so v = √(γRT/M) — pressure cancels. At fixed temperature, changing pressure changes density proportionally, leaving v unchanged; correct.

B. v depends on density (through P/ρ); changing density at fixed pressure changes v.

C. v ∝ √T; temperature strongly affects speed.

D. Speed differs greatly between air, water, solids.

Question 78 Physics

Maximum displacement of particles form it mean position is called:

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

A. Cycles per second, not a displacement.

B. The maximum displacement from the mean/equilibrium position; correct.

C. The spatial length of one cycle.

D. A peak point of the wave, not the displacement measure. (Stem prints "form it" for "from its".)

79 Physics

The ultrasonic waves have frequency higher than:

- A. 20 Hz
- B. 20 KHz ✓ **Correct answer**
- C. 200 Hz
- D. 2000 KHz

A. The LOWER limit of human hearing (infrasound is below this).

B. Above the ≈20 kHz upper hearing limit: ultrasound; correct.

C. Well within the audible range.

D. 2 MHz: ultrasonic, but far above the threshold the definition uses; not the boundary value.

Question 80 Physics

The increase in the speed of sound for each degree rise above 0o C is:

- A. 0.61 m/s ✓ **Correct answer**
- B. 0.51 m/s
- C. 0.41 m/s
- D. 0.31 m/s

A. Working: v ≈ 331 + 0.61·T(°C) m/s near 0 °C, so each °C adds ≈0.61 m/s. Correct.

B. Too low by 0.10.

C. Too low by 0.20.

D. Half the standard coefficient.

81 Physics

Continuous, regular and rhythmic disturbance in a medium resulting periodic vibration of a source causes_____in the medium:

- A. Complex waves
- B. Stationary waves
- C. Electromagnetic waves
- D. Periodic waves ✓ **Correct answer**

A. Superpositions of several frequencies, not the named result of regular periodic vibration.

B. Need two opposing waves interfering; not produced by a single periodic source alone.

C. Need no medium and are not a disturbance IN a medium.

D. A regular rhythmic disturbance produces waves that repeat periodically; correct.

Question 82 Physics

The thermodynamic process during which volume of the system remains constant is called:

- A. Isothermal
- B. Isobaric
- C. Isochoric ✓ **Correct answer**
- D. Adiabatic

A. Constant temperature.

B. Constant pressure.

C. Constant volume (isovolumetric); correct.

D. No heat exchange; volume may change.

83 Physics

The conditions for application of Boyle’s law holds good in:

- A. Adiabatic process
- B. Isothermal process ✓ **Correct answer**
- C. Isobaric process
- D. Isochoric process

A. Temperature changes, so PV ≠ constant.

B. Boyle's law (PV = constant) holds at constant temperature; correct.

C. Pressure is constant, so PV varies with V.

D. Volume is constant, so PV varies with P.

Question 84 Physics

The internal energy of a system during an isothermal process:

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

A. Working: for an ideal gas U depends only on T; T constant ⇒ ΔU = 0. Would need a temperature fall.

B. Would need a temperature rise.

C. Internal energy is not zero at any ordinary temperature.

D. Correct (ideal-gas assumption, as the paper intends).

85 Physics

Electric intensity due to charge distributions are calculated using which following law?

- A. Ohm's law
- B. Faraday's law
- C. Gauss's law ✓ **Correct answer**
- D. Ampere's law

A. Relates V, I and R; it does not give fields from charge distributions.

B. Induced emf from changing magnetic flux.

C. Flux through a closed surface = enclosed charge/ε_0; the standard tool for symmetric charge distributions; correct.

D. Magnetic fields from currents, not electric fields from charges.

Question 86 Physics

The capacitance of capacitor does not depend on:

- A. Area of plates
- B. Medium
- C. Distance between plates
- D. Thickness of plates ✓ **Correct answer**

A. Working: $C = \varepsilon A/d$. $C \propto A$; it does depend on it.

B. ε (dielectric) sets C; it does depend on it.

C. $C \propto 1/d$; it does depend on it.

D. Does not appear in $C = \varepsilon A/d$ for ideal plates; correct.

87 Physics

The SI unit of potential difference is:

- A. Volt ✓ **Correct answer**
- B. Coulomb
- C. Watt
- D. eV

A. 1 V = 1 J/C, the SI unit of potential difference; correct.

B. Unit of charge.

C. Unit of power.

D. Electronvolt, a unit of ENERGY (1.602×10^{-19} J), not the SI unit of potential.

Question 88 Physics

Electric potential is defined as:

- A. Work per unit charge ✓ **Correct answer**
- B. Force per unit charge
- C. Power per unit charge
- D. Force

A. V = W/q, work to bring unit positive charge from infinity; correct.

B. That is electric FIELD intensity (E = F/q).

C. No such definition.

D. Force itself, not potential.

Question 89 Physics

Ohm meter us the unit of:

istance

- B. Resistivity ✓ **Correct answer**
- C. Conductance
- D. conductivity

A. Working: R = ρL/A ⇒ ρ = RA/L, units Ω·m. Unit is the ohm (Ω) alone.

B. Ω·m; correct.

C. Siemens (S = Ω^{-1}).

D. S/m. (Stem prints "us" for "is".)

Question 90 Physics

1eV is equal to:

- A. 1.602 x 10-19 J ✓ **Correct answer**
- B. 16.02 x 10-19 J
- C. 1620 J
- D. 162.0 x 10-19 J

A. Working: 1 eV = e × 1 V = 1.602×10^{-19} C × 1 V = 1.602×10^{-19} J. Correct.

B. Ten times too large.

C. Enormously too large.

D. One hundred times too large.

Question 91 Physics

The total resistance of wire isinversely proportional to:

- A. Length
- B. Area ✓ **Correct answer**
- C. Temperature

A. Working: R = ρL/A. R is DIRECTLY proportional to length.

B. R ∝ 1/A: inversely proportional to cross-sectional area; correct.

C. Resistance generally rises with temperature, but not as a simple inverse proportion.

D. Resistance does not depend on time. (Stem prints "isinversely".)

Question 92 Physics

Kilowatt hour is a unit of:

- A. Energy ✓ **Correct answer**
- B. Energy x time
- C. Power
- D. (power)(energy)

A. Working: 1 kWh = 1000 W × 3600 s = 3.6×10^{6} J. Power × time = energy; correct.

B. That would be J·s, a different quantity.

C. Power's unit is the watt/kilowatt itself.

D. A meaningless product with units W·J.

Question 93 Physics

The force exerted on charged particle will be maximum when it enters the magnetic field at:

- A. 60O
- B. 90O ✓ **Correct answer**
- C. 0O
- D. 45O

= qvB sinθ, maximum when sinθ = 1, θ = 90°. sin60° ≈ 0.87, less than maximum.

B. Correct.

C. sin0° = 0: no force.

D. sin45° ≈ 0.71.

Question 94 Physics

When a charged particle enters the magnetic field parallel then it will:

- A. Deflect toward north
- B. Deflect toward south
- C. Move straight ✓ **Correct answer**
- D. Move in circular path

A. Working: θ = 0° ⇒ F = qvB sin0° = 0. No force acts, so no deflection in any compass direction.

B. Likewise no deflection.

C. With no force, it continues undeflected; correct.

D. Circular motion needs a perpendicular force component.

Question 95 Physics

Two balls collide each other, it has been observed that the collision is elastic. Which statement is advocates the observation?

- A. K.E before collision = K.E after collision ✓ **Correct answer**
- B. Momentum before collision = Momentum after collision
- C. K.E before collision ≠ K.E after collision
- D. Momentum before collision ≠ Momentum after collision

IING feature of an elastic collision; correct.

B. True in ALL isolated collisions, elastic or not, so it does not specifically show elasticity.

C. That describes an INELASTIC collision.

D. False for an isolated collision; momentum is conserved.

Question 96 Physics

The gradient of velocity time is equal to:

- A. Distance
- B. Force
- C. Acceleration ✓ **Correct answer**
- D. Speed

A. Working: gradient = Δv/Δt = acceleration. Area under a velocity–time graph gives displacement, not gradient.

B. Force = mass × acceleration; gradient alone is not force.

C. Correct.

D. Speed is the value of velocity itself, not its gradient.

Question 97 Physics

At what pair of angles for a projectile, the ranges are equal?

- A. 20O, 60O
- B. 60O, 30O ✓ **Correct answer**
- C. 40O, 60O
- D. 25O, 55O

A. Working: $R = (u^2 \sin 2\theta)/g$; $\sin 2\theta$ is equal for θ and $(90° - \theta)$. Sum 80°, not complementary.

complementary angles, equal ranges; correct.

C. Sum 100°.

D. Sum 80°.

Question 98 Physics

Two car traveling on straight road in opposite direction with speed 70 kmh-1 and 60 kmh-1, their relative velocity will be:

- A. 10 kmh-1
- B. 130 kmh-1 ✓ **Correct answer**
- C. 65 kmh-1
- D. 5 kmh-1

A. Working: approaching each other, relative speed = 70 + 60 = 130 km/h. The difference; that is the relative speed if they travelled the SAME direction.

B. Correct.

C. The average speed; irrelevant.

D. No combination gives this.

Question 99 Physics

Two bodies having same mass undergo elastic collision then their velocities after collision will be:

- A. v1' = 0 v2' = v1
- B. v1' = v2 v2' = 0
- C. v1' = v1 v2' = v2
- D. v1' = v2 v2' = v1 ✓ **Correct answer**

A. Working: conservation of momentum + kinetic energy for equal masses in a head-on

on gives exchange of velocities. True only in the special case $v_2 = 0$ initially, not in general.

B. True only if $v_1 = 0$ initially.

C. Velocities unchanged: no collision at all.

D. Correct in general.

Question 100 Physics

The angle of projection of a projectile for which its maximum height and horizontal range are equal is:

- A. 86O
- B. 46 O
- C. 66 O
- D. 76 O ✓ **Correct answer**

A. Working: $H = u^2\sin^2\theta/(2g)$, $R = u^2\sin2\theta/g = 2u^2\sin\theta\cos\theta/g$. Setting $H = R$: $\sin^2\theta/2 = 2\sin\theta\cos\theta \Rightarrow \tan\theta = 4 \Rightarrow \theta = \arctan 4 \approx 75.96° \approx 76°$. $\tan86° \approx 14.3$, far above 4.

B. $\tan46° \approx 1.04$.

C. $\tan66° \approx 2.25$.

D. Correct.

Question 101 Physics

Slope of distance time graph can never be:

- A. Positive
- B. Negative ✓ **Correct answer**
- C. Constant
- D. Zero

increases with time, slope positive.

B. Distance (a scalar total travelled) can never decrease, so its graph's slope can never be negative; correct.

C. Uniform speed gives a constant slope.

D. At rest, distance stays constant, slope zero. (For a DISPLACEMENT–time graph a negative slope would be possible; the stem says distance.)

Question 102 Physics

At highest point in a projectile motion, the velocity will be:

- A. Vx = 0 Vy = 0
- B. Vx = 0 Vy = constant
- C. Vx = constant Vy = constant
- D. Vx = constant Vy = 0 ✓ **Correct answer**

A. The projectile still moves horizontally at the peak.

B. No horizontal force acts (air resistance neglected), so Vx never becomes zero.

C. Vy decreases under gravity throughout the flight.

D. Horizontal component unchanged, vertical component momentarily zero at the peak; correct.

Question 103 Physics

The unit of power in British engineering system is:

- A. Horse power ✓ **Correct answer**
- B. Watt
- C. Js-1
- D. Js

ional British (imperial) engineering power unit; correct.

B. The SI unit of power.

C. Dimensionally a watt (SI), not the British unit.

D. Joule-seconds: not a power unit at all.

Question 104 Physics

Work done will be negative if the angle between force and displacement is:

- A. 0 O
- B. 45 O
- C. 60 O
- D. 180 O ✓ **Correct answer**

A. Working: W = Fs cosθ. cos0° = +1: maximum positive work.

B. cos45° > 0: positive work.

C. cos60° = +0.5: positive work.

D. cos180° = −1: force opposite displacement, work negative; correct.

Question 105 Physics

1 Nms-1 = :

- A. 1 Kilo watt hour
- B. 1 J.s
- C. 1 watt ✓ **Correct answer**
- D. 1 J.s-2

A. Working: 1 N·m = 1 J, so 1 $N \cdot m \cdot s^{-1}$ = 1 $J \cdot s^{-1}$ = 1 W. 3.6×10^6 J, an energy, not a power.

B. Wrong power of s.

D. Wrong dimensions.

Question 106 Physics

In inter-conversion of energy, the work done against the friction is:

- A. f + h
- B. f - h
- C. fh ✓ **Correct answer**
- D. f / h

A. Adding a force to a distance is dimensionally meaningless.

B. Likewise meaningless.

C. Work = force × distance: friction force f times distance h; the keyed answer. Flagged: the stem never defines f or h, and the question as printed is garbled; the answer is the only dimensionally sensible option.

D. Force divided by distance is not work.

Question 107 Physics

A car of mass 800 Kg accelerates from 20m-1 to 30ms-1, the increase in K.E is:

- A. 2 J
- B. 200 KJ ✓ **Correct answer**
- C. 200 J
- D. 2 KJ

A. Working: $\Delta KE = \frac{1}{2}m(v^2 - u^2) = \frac{1}{2} \times 800 \times (900 - 400) = 400 \times 500 = 200{,}000$ J = 200 kJ. Absurdly small.

B. Correct.

small.

D. 100× too small. (Stem prints "20m-1" for 20 m/s.)

Question 108 Physics

In Fleming's right hand rule the middle finger indicates:

- A. Force
- B. Magnetic field
- C. Induced current ✓ **Correct answer**
- D. Volt

A. The THUMB (direction of motion) in the right-hand (generator) rule.

B. The FIRST/fore finger.

C. The MIDDLE (second) finger; correct.

D. A unit, not a direction the fingers represent.

Question 109 Physics

Transformer works on the principle of:

- A. Lenz's Law
- B. Faraday's Law
- C. Mutual Induction ✓ **Correct answer**
- D. Ampere's Law

A. Gives the DIRECTION of induced emf; not the named transformer principle.

B. Underlies induction generally (changing flux induces emf), but the specific transformer mechanism is mutual induction between two coils.

C. Changing primary current induces emf in the secondary via shared flux; the named principle; correct.

fields from currents, not the transformer principle.

Question 110 Physics

The efficiency of transformer is:

- A. 60 %
- B. 70 %
- C. 80 %
- D. 90 % ✓ **Correct answer**

A. Below typical transformer efficiency.

B. Below typical.

C. Possible for a small/poor transformer, but below the textbook figure.

D. The keyed textbook figure for a good transformer (real large transformers reach 95–99%). Flagged: efficiency is not a fixed constant; the answer is the paper's conventional figure, not a law of nature.

Question 111 Physics

Lenz’s law is also a statement of law of conservation of:

- A. Charge
- B. Energy ✓ **Correct answer**
- C. Momentum
- D. Mass

A. Conservation of charge underlies Kirchhoff's current rule, not Lenz's law.

B. Lenz's law (induced effects oppose the change) prevents energy being created from nothing; correct.

C. Not what Lenz's law expresses.

Lenz's law expresses:

Question 112 Physics

A process in which only one half of alternating current is converted into direct current is called:

- A. Full wave rectification
- B. Amplification
- C. Half wave rectification ✓ **Correct answer**
- D. Magnification

A. Uses BOTH half-cycles.

B. Increasing signal size, not AC→DC conversion.

C. Only one half-cycle passes to DC; correct.

D. Optical enlargement; irrelevant.

Question 113 Physics

Efficiency of full wave rectifier circuit is almost_____than half wave rectifier circuit:

- A. Four times
- B. Same as
- C. Sixteen times
- D. Double ✓ **Correct answer**

A. Working: half-wave efficiency ≈ 40.6%, full-wave ≈ 81.2%; ratio ≈ 2. Would need ≈162% efficiency: impossible.

B. Full-wave uses both halves; it is more efficient.

C. Impossible.

D. Correct (approximately).

114 Physics

The conversion of alternating current into direct current is called rectification and circuit is called rectifier. Which component of electronics acts as a rectifier?

- A. Diode ✓ **Correct answer**
- B. Transistor
- C. Transformer
- D. Inductor

A. Conducts in one direction only, the basic rectifying element; correct.

B. An amplifier/switch; not a rectifier by itself.

C. Changes AC voltage level; its output is still AC.

D. Opposes current change; it filters but does not rectify.

Question 115 Physics

Red light is used in photographic dark room because of:

- A. More frequency, less wavelength
- B. Less frequency, less wavelength
- C. Less frequency, more wavelength ✓ **Correct answer**
- D. More frequency, more wavelength

A. That describes blue/violet light, which would fog the paper.

B. Self-contradictory: frequency and wavelength are inversely related.

C. Red light: lowest visible frequency, longest wavelength; photographic emulsions are least sensitive to it; correct.

D. Self-contradictory.

116 Physics

Which photons carries the most energy?

- A. Blue
- B. Violet ✓ **Correct answer**
- C. Red
- D. Green

A. Working: E = hf; violet has the highest frequency of the colours listed. High frequency, but below violet.

B. Highest frequency, hence highest photon energy; correct.

C. Lowest frequency of the four.

D. Mid-spectrum frequency.

Question 117 Physics

Which one of the following series lies in the ultraviolet region?

- A. Balmer series
- B. Paschen series
- C. Lyman series ✓ **Correct answer**
- D. Bracket series

A. Transitions to n = 2: visible light.

B. To n = 3: infrared.

C. To n = 1: ultraviolet; correct.

D. To n = 4: infrared. (Stem prints "Bracket".)

118 Physics

Which x-ray photon will have longest wavelength?

- A. Kα
- B. Kβ
- C. Kγ
- D. Mα ✓ **Correct answer**

A. Working: E = hc/λ, so the longest wavelength means the SMALLEST transition energy. The printed key, but WRONG as written: the smallest-energy transition WITHIN the K series (n = 2 → 1) — but the stem does not restrict the question to the K series.

B. n = 3 → 1: larger energy, shorter wavelength than Kα.

C. n = 4 → 1: larger energy still, shorter wavelength.

D. An M→L transition (n = 3 → 2): its energy (≈1.8 keV for tungsten, far below Kα ≈59 keV) is much SMALLER than any K transition, so its wavelength is much LONGER; correct. VERIFIED: MIT OCW + Doubtnut — λ(Mα) > λ(Kα); the Mα transition has the smallest energy and therefore the longest wavelength of the four listed.

Note: FILE CORRECTION: the printed key A (K-alpha) is WRONG as written — the stem does not restrict the question to the K series, and lambda(M-alpha) > lambda(K-alpha). Corrected openly to D (M-alpha) on MIT OCW + Doubtnut. See the 5 Nov 2026 sprint addendum.

Question 119 Physics

The half-life of Iodine – 31 is:

- A. 10 days
- B. 8 days ✓ **Correct answer**
- C. 45 days
- D. 60 days

drife value.

B. Iodine-131's half-life is ≈8.02 days; correct value. Flagged: the stem prints "Iodine – 31"; there is no medically relevant iodine-31 — the intended isotope is iodine-131, and the answer is recorded on that understanding.

C. No iodine isotope of this use has this half-life.

D. Likewise incorrect.

Question 120 Physics

The half-life of carbon is 5730 years. How much carbon will left after 22920 years?

- A. 1/32nd
- B. 1/16th ✓ **Correct answer**
- C. 1/64th
- D. 1/4th

A. Working: 22920 ÷ 5730 = 4 half-lives; remaining fraction = $(½)^4$ = 1/16. Five half-lives.

B. Correct.

C. Six half-lives.

D. Two half-lives. ("Carbon" here means carbon-14; the stem omits the mass number.)

Question 121 Physics

Skin burns, loss of hair, drop in the white blood cells etc. are examples of:

- A. Somatic effect ✓ **Correct answer**
- B. Genetic effect
- C. Metabolism effect
- D. Mutation effect

A. Effects seen in the exposed individual (body cells), correct.

ssed to offspring via germ cells; these symptoms are not that.

C. Not a standard radiation-effect class.

D. Mutations are changes in DNA; burns/hair loss are tissue effects, not classified as mutation effects.

Question 122 Logical Reasoning

Read the given passage and the following statements below. Then choose the option, basing your answer only on the information provided. The Early Medieval period (642-1219 CE) witnessed the spread of Islam in a region which is now known as Pakistan. During this period, Sufi missionaries played a pivotal role in converting a majority of the regional Buddhist population to Islam. Statements: I. Islam was spread in Pakistan region during the Early Medieval period. II. Sufi missionaries converted a lot of people to Islam during this time by force. III. It can be said that the Sufis were responsible for Pakistan ultimately become an Islamic country.

- A. Only I is correct. ✓ **Correct answer**
- B. Only I and II are correct.
- C. I, II and III all are correct.
- D. Only I and III are correct.

A. I restates the passage's first sentence; II adds "by force", which the passage never says; III claims ultimate responsibility for the country becoming Islamic, which goes beyond the passage (it speaks only of converting a majority of Buddhists in that period). Correct.

B. II's "by force" is unsupported.

C. II and III both overreach the passage.

D. III overreaches the passage.

123 Logical Reasoning

Read the following and choose the correct answer: “X, Y and Z are three whole numbers less than 24 but greater than 11. X is the smallest prime number. Y is the largest number divisible by 3. Z is the samallest number divisible by 11”?

- A. X is 13, Y is 24, Z is 11.
- B. X is 13, Y is 21, Z is 22. ✓ **Correct answer**
- C. X is 11, Y is 21, Z is 11.
- D. X is 11, Y is 24, Z is 22.

A. Working: numbers strictly between 11 and 24: 12–23. Smallest prime in that range = 13 (X). Largest multiple of 3 below 24 = 21 (Y). Smallest multiple of 11 above 11 = 22 (Z). Y = 24 violates "less than 24"; Z = 11 violates "greater than 11".

B. 13, 21, 22: correct.

C. X and Z = 11 violate "greater than 11".

D. X = 11 and Y = 24 both violate the bounds.

Question 124 Logical Reasoning

I. The government has increased the taxes on all bussinesses in pakistan. II. Many small businesses will have to close their operations in pakistan.]

- A. Statement I is the cause and statement II is its effect. ✓ **Correct answer**
- B. Statement II is the cause and statement I is its effect.
- C. Both the statements I and II are independent causes.
- D. Both the statements I and II are effects of independent causes.

A. Higher taxes raising costs plausibly force small businesses to close; correct.

B. Business closures do not cause a tax rise in this framing.

C. The two are causally linked, not independent.

ies the direct link the statements present.

Question 125 Logical Reasoning

Read the following statement, assuming everything in it to be true. Then decide which of the given suggested courses of action logically follow and are pursuing. Statement: My laptop's battery is low and needs to be charged. Courses of Action: I. Stop using the laptop to save power. II. Get a new fully charged battery and replace it with my old one.

- A. I. ✓ **Correct answer**
- B. II.
- C. Both I and II.
- D. Neither I nor II.

A. The course that follows: the battery is low, so stopping use to save the remaining power is a practical step addressing the stated problem.

B. Replacing the battery presumes a spare fully charged battery exists, which the statement never states, and it does not charge the low battery.

C. II does not follow, so both cannot.

D. The filed key, but WRONG under the course-of-action convention these items use: a course of action follows when it is a practical step addressing the stated problem, not only when it is logically mandatory. CORRECTED OPENLY 8 Nov 2026: filed D → A, decided by assistant under the owner's 8 Nov 2026 delegation. Evidence: the Medix 'Logical Reasoning Past Papers' compilation (Scribd) reproduces this exact item and keys it A (I only) with the explanation 'The correct course of action that logically follows from the statement is to stop using the laptop to save power'. No official SZABMU key was located to arbitrate; the item is recycled from Federal MDCAT 2022 (SZABMU 2022 Q127).

Note: FILE CORRECTION: the filed key D (Neither I nor II) is WRONG under the course-of-action convention these items use. Corrected openly to A (I only) 8 Nov 2026, decided by the assistant under the owner's 8 Nov 2026 delegation. Evidence: the Medix 'Logical

Past Papers' compilation (Scribd) reproduces this exact item and keys it A (I only) with the explanation 'The correct course of action that logically follows from the statement is to stop using the laptop to save power'. No official SZABMU key was located; the item is recycled from Federal MDCAT 2022 (SZABMU 2022 Q127).

Question 126 Logical Reasoning

All hammers are tools. Some tools are useless things. All useless things are trash. Which of the following conclusions are NECESSARILY TRUE given only in information above? Conclusions: I. Some hammers are trash. II. Some tools are trash. III. All useless things are tools.

- A. I and III.
- B. I and II.
- C. II and III.
- D. II ✓ **Correct answer**

A. Working: some tools are useless, and all useless things are trash, so the useless tools are trash: some tools are trash (II). I does not follow: nothing says any hammer is among the useless tools. III does not follow: only SOME tools are useless, so useless things need not all be tools.

B. I does not follow (nothing says any hammer is useless), although II does follow.

C. II follows, but III does not follow.

D. Follows necessarily: some tools are useless, and all useless things are trash, so some tools are trash; correct.

Question 127 Chemistry

The molecules of iodine (I2) form the:

- A. Molecular crystals ✓ **Correct answer**
- B. Covalent crystals

c crystals

- D. Metallic crystals

A. Solid I_2 consists of discrete I_2 molecules held by weak van der Waals forces; correct.

B. A giant covalent network (e.g. diamond); I_2 is not networked.

C. Ions in a lattice (e.g. NaCl); I_2 has no ions.

D. Metal cations in a sea of electrons; iodine is a non-metal.

Question 128 Chemistry

When two ice cubes are pressed over each other, they unite to form one cube due to:

- A. Dipole dipole attraction
- B. Covalent attraction
- C. Van Der Waal's forces
- D. H - bonding ✓ **Correct answer**

A. A general intermolecular force, but not the named mechanism for ice uniting.

B. No new covalent bonds form between the cubes.

C. Weak attractions act between the cubes, and the site's own explanation text actually argues for this option — but the MARKED answer is D.

D. The marked answer: the cubes unite by regelation (pressure melting and refreezing), rebuilding the hydrogen-bonded ice lattice across the join. Flagged: the source page is internally inconsistent (explanation favours C, key favours D); D is recorded as keyed, with regelation as the physical mechanism.

Question 129 Chemistry

For the chemical reaction: N2(g) + 3H2(g) ⇌ 2NH3(g) + Heat We can get maximize the yield of NH3:

- B. By decreasing the pressure
- C. By increasing the volume of the reaction vessel
- D. By continuous withdrawal of ammonia after intervals ✓ **Correct answer**

A. The forward reaction is exothermic; heat shifts equilibrium LEFT, lowering yield.

B. 4 gas moles → 2; lower pressure favours the side with MORE moles (left).

C. Same as decreasing pressure: shifts left.

D. Removing product pulls equilibrium right (Le Chatelier), maximising yield; correct.

Question 130 Chemistry

The high pressure of 200 atm in Haber's process is used for:

- A. Better yield ✓ **Correct answer**
- B. Lower yield
- C. Lower rate
- D. Cost decrease

A. High pressure shifts the 4→2 mole equilibrium toward NH_3; correct.

B. The opposite of the pressure effect.

C. Pressure raises rate (more collisions); it does not lower it.

D. High-pressure plant is MORE expensive; cost is the reason pressure is capped at ~200 atm, not the benefit.

Question 131 Chemistry

By which of the following factors equilibrim state is attained earlier?

- A. Temperature
- B. Pressure

centration

- D. Catalyst ✓ **Correct answer**

A. Changes the equilibrium POSITION and the rate, but "attained earlier" without changing composition is the catalyst's role.

B. Changes position, not merely speed of attainment.

C. Changes position.

D. Speeds forward and reverse reactions equally, reaching the SAME equilibrium sooner; correct.

Question 132 Chemistry

Which of the following is not the use of Buffer solution?

- A. Used for the caliberation of pH meters
- B. Used to preserve biologicalspecimen
- C. Maintain the pH of the human blood
- D. Predict the concentration of a substance ✓ **Correct answer**

A. Standard buffers calibrate pH meters; a real use.

B. Buffers maintain pH in preservation fluids; a real use.

C. The bicarbonate buffer maintains blood at ≈pH 7.4; a real use.

D. Buffers do not predict concentrations; correct as the non-use.

Question 133 Chemistry

What is incorrect about activated complex?

- A. It is a high energy specie
- B. It is a stable specie ✓ **Correct answer**
- C. It is an unstable specie

ential energy is maximum at activated complex stage

A. True: the transition state sits at the energy maximum.

B. FALSE: the activated complex is transient and unstable, existing only at the top of the barrier; correct as the incorrect statement.

C. True.

D. True: the energy profile peaks at the activated complex.

Question 134 Chemistry

The unit of rate constants is the same as the rate of reaction in which of the following order of reaction?

- A. Zero ✓ **Correct answer**
- B. First
- C. Second
- D. Third

A. Working: rate has units $mol \cdot L^{-1} \cdot s^{-1}$. For zero order, rate = k, so k has the same units. Correct.

B. k has units s^{-1}.

C. k has units $L \cdot mol^{-1} \cdot s^{-1}$.

D. k has units $L^{2} \cdot mol^{-2} \cdot s^{-1}$.

Question 135 Chemistry

If a reaction is first order with respectd to a reactant then the rate will be_____if the concentration of reactant is doubled:

- A. Doubled ✓ **Correct answer**
- B. Halved

- to the fourth
- D. Quadrupled

A. Working: rate ∝ $[A]^1$, so doubling [A] doubles the rate. Correct.

B. That would be inverse order.

C. That would follow from halving under second order.

D. That is second-order behaviour.

Question 136 Chemistry

The correct equation for the first law of thermodynamics is:

- A. ΔE = q + w ✓ **Correct answer**
- B. ΔE = w - q
- C. ΔE = Δq - pΔv
- D. ΔE = Δq + pΔv

A. Change in internal energy = heat added + work done ON the system (chemistry sign convention); correct.

B. Wrong sign on heat.

C. Mixes Δq (not a state quantity) with the wrong work sign.

D. Work done BY the system is pΔV, but with the chemistry convention work ON the system is −pΔV; this form is inconsistent.

Question 137 Chemistry

One calorie is equal to:

- A. 4.18 KJ
- B. 4.18 J ✓ **Correct answer**
- C. 0.418 KJ $mole^{-1}$

A. Working: 1 cal = 4.184 J. 1000× too large (that is ≈1 kcal).

B. Correct.

C. Wrong value and wrong per-mole framing.

D. 418 J, 100× too large.

Question 138 Chemistry

The thermal energy at constan pressure is called:

- A. Enthalpy ✓ **Correct answer**
- B. Internal energy
- C. Heat capacity
- D. Work done

A. H = E + pV; heat absorbed at constant pressure equals ΔH; correct.

B. The total energy E; heat at constant VOLUME equals ΔE.

C. Heat needed per degree of temperature rise.

D. Energy transfer by force through distance, not the constant-pressure thermal quantity.

Question 139 Chemistry

Which statement correctly describes the term Standard Electrode Potential?

- A. It is the electrode potential determined at room temperature and pressure
- B. It is the electrode potential determined under standard conditions using StandardHydrogen Electrode as the other electrode ✓ **Correct answer**
- C. It is the electrode potential of an element and its solution compared to a standard value
- D. It is the potential which is measured when two half cells are connected together

te. standard conditions also require 1 mol/dm³ concentrations and 1 atm/1 bar gas pressures.

B. The full definition (298 K, 1 M, 1 atm, SHE = 0.00 V); correct.

C. Vague; it does not name the SHE reference or standard conditions.

D. That describes any cell potential measurement, not the STANDARD electrode potential.

Question 140 Chemistry

Oxidation number of an element in free state is:

- A. Negative
- B. Positive
- C. Zero ✓ **Correct answer**
- D. ±1

A. Free elements (e.g. Na, O_2) have oxidation number 0, not negative.

B. Likewise wrong for the free state.

C. By definition, an uncombined element has oxidation number 0; correct.

D. Applies to some ions (e.g. Na^+, Cl^-), not to free elements.

Question 141 Chemistry

The branch of science which deals with the conversion of electrical energy to chemical energy and vice versa is called:

- A. Electrochemistry ✓ **Correct answer**
- B. Thermochemistry
- C. Stereochemistry
- D. Biochemistry

A. Cells, electrolysis, electrode potentials: exactly this interconversion; correct.

ges in chemical reactions.

C. Spatial arrangement of atoms in molecules.

D. Chemistry of living organisms.

Question 142 Chemistry

Which of the following has greatest difference of electronegativity?

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

A. Working: F (4.0) − H (2.1) = 1.9, the largest gap; the difference falls down the group as halogen electronegativity falls (Cl 3.0, Br 2.8, I 2.5). Correct.

B. Difference 0.9.

C. Difference 0.7.

D. Difference 0.4, the smallest.

Question 143 Chemistry

Ionization energy decreases down the group because:

- A. Shielding remains constant
- B. Atomic radius remains constant
- C. Proton number increases
- D. Atomic radius increases ✓ **Correct answer**

A. Shielding INCREASES down a group.

B. Radius increases down a group.

more protons would INCREASE attraction; it is not the reason ionisation energy falls.

D. Outer electrons are farther from the nucleus and more shielded, so less energy removes them; correct.

Question 144 Chemistry

Carbon atoms in ethane are hybridized:

- A. Sp3 ✓ **Correct answer**
- B. Sp2
- C. Sp
- D. Sp3d

A. Each ethane carbon forms four σ bonds (one C–C, three C–H); correct.

B. For carbons with a double bond (alkenes).

C. For carbons with a triple bond (alkynes).

D. Five-coordinate geometry; not present in ethane.

Question 145 Chemistry

The type of bonding in Zinc is:

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

A. Zinc metal contains no ions paired with anions.

B. No shared electron pairs between zinc atoms.

C. A coordinate bond in compounds, not in the element.

ores in a sea of delocalised electrons; correct.

Question 146 Chemistry

Which of the following is semiconductor?

- A. Al
- B. Si ✓ **Correct answer**
- C. P
- D. Mg

A. A metal conductor.

B. Silicon, the archetypal semiconductor; correct.

C. Phosphorus, a non-metal insulator used as a dopant, not a semiconductor itself.

D. A metal conductor.

Question 147 Chemistry

Which of the following property decreases in Group 2 as we go down the group?

- A. Shielding
- B. Atomic radius
- C. Proton number
- D. Ionization energy ✓ **Correct answer**

A. Increases down the group (more shells).

B. Increases down the group.

C. Increases down the group.

D. Decreases, as outer electrons are farther and more shielded; correct.

148 Chemistry

Which of the following alkali metal can form normal oxides as well as peroxides?

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

A. The keyed textbook answer: sodium forms Na_2O (normal oxide) and Na_2O_2 (peroxide) with excess oxygen.

B. Potassium's characteristic product with oxygen is the superoxide KO_2 (it can also form K_2O/K_2O_2, so the textbook distinction is one of the usual product, not strict impossibility).

C. Forms essentially only the normal oxide Li_2O.

D. Forms mainly the superoxide CsO_2. Flagged: the answer is the standard textbook classification, not an exclusive chemical fact.

Question 149 Chemistry

The transition element which doesn't show variable valency:

- A. Cu
- B. Sc
- C. Zn ✓ **Correct answer**
- D. Cr

A. Shows +1 and +2 (variable).

B. Shows mainly +3 but +1/+2 are known; the textbook treats scandium as showing limited variability, though Zn is the classic answer.

C. Filled d^{10} shell; essentially only +2, no variable valency; correct.

D. Shows +2, +3, +6 etc. (highly variable).

150 Chemistry

The binding energy of transition metals increases upto group:

- A. II B
- B. IV B
- C. III B
- D. VI B ✓ **Correct answer**

A. Late in the series, where binding energy has fallen (filled d shell).

B. Binding energy is still rising at group 4.

C. Early in the rise.

D. The keyed maximum: cohesive/binding energy rises with the number of unpaired d-electrons available for metal–metal bonding, peaking around group 6 (Cr/Mo/W region) before falling. Flagged: the trend is a textbook generalisation over the 3d/4d/5d series, not a sharp law.

Note: Promoted SINGLE-SOURCE -> VERIFIED on the 5 Nov 2026 sprint addendum's two-source evidence (Exceptional Educations + Vedantu: binding energy peaks at group 6).

Question 151 Chemistry

Homo-cyclic organic compounds are sub divided into two groups namely:

- A. Alicyclic and Aromatic ✓ **Correct answer**
- B. Open chain and branched chain
- C. Aromatic and non-aromatic
- D. Anti-aromatic

A. Homocyclic (all-carbon rings) divide into alicyclic (saturated/unsaturated non-aromatic rings) and aromatic rings; correct.

B. Divisions of ACYCLIC compounds, not homocyclic.

escription, not the textbook subdivision named.

D. A property of some 4n π systems, not a subdivision class.

Question 152 Chemistry

The type of isomerism arising due to shifting of proton fron one atom to another in the same molecule is:

- A. Chain isomerism
- B. Metamerism
- C. Tautomerism ✓ **Correct answer**
- D. Postion isomerism

A. Different carbon skeletons.

B. Different alkyl groups around a functional group.

C. Proton shift within the molecule (e.g. keto ⇌ enol); correct.

D. Same skeleton, functional group in a different position.

Question 153 Chemistry

In alkanes, each Carbon has hybridization:

- A. Sp3 ✓ **Correct answer**
- B. Sp
- C. Sp2
- D. dsp

A. Alkane carbons form four single bonds; correct.

B. Triple-bonded carbons.

C. Double-bonded carbons.

tane hybridisation.

Question 154 Chemistry

For the reaction given below: N2 + 3H2 ⇌ 2NH3 How many moles N2 are required for synthesis of 4 moles of NH3?

- A. 4 moles of N2
- B. 2 moles of N2 ✓ **Correct answer**
- C. 3 moles of N2
- D. 4.5 moles

A. Working: 1 mol N_2 → 2 mol NH_3, so 4 mol NH_3 needs 4 ÷ 2 = 2 mol N_2. Would make 8 mol NH_3.

B. Correct.

C. Would make 6 mol NH_3.

D. Would make 9 mol NH_3.

Question 155 Chemistry

Al reacts with O2 according to the following reaction: 4Al + 3O2 ⟶ 2Al2O3 27g of Al will react with how much of O2?

- A. 8 g
- B. 16 g
- C. 24 g ✓ **Correct answer**
- D. 32 g

A. Working: 27 g Al = 1 mol. Ratio: 4 mol Al : 3 mol O_2, so 1 mol Al needs ¾ mol O_2 = 0.75 × 32 g = 24 g. ¼ mol O_2.

B. ½ mol O_2.

D. 1 mol O_2 (the amount for 4/3 mol Al).

Question 156 Chemistry

One mole of a substance is the amount of that substance that has the same number of particles (atom, ions or molecules) as there are atoms in exactly:

- A. 1.008 g of hydrogen gas (H2)
- B. 16 g of oxygen gas (O2)
- C. 12 g of carbon-12 isotopes ✓ **Correct answer**
- D. 12 g of magnesium

A. That is ½ mol of H_2 molecules (1 mol of H atoms).

B. That is ½ mol of O_2 molecules.

C. The defining reference: one mole contains as many entities as there are atoms in exactly 12 g of ^{12}C; correct.

D. That is ½ mol of Mg.

Question 157 Chemistry

Principle quantum number is represented by the symbol:

- A. m
- B. n ✓ **Correct answer**
- C. s
- D. l

A. Magnetic quantum number (m_l).

B. Principal quantum number (shell/energy level); correct.

C. Spin quantum number.

/angular-momentum quantum number.

Question 158 Chemistry

Shape of the sub shell is explained by which quantum number:

- A. Principal quantum number
- B. Azimuthal quantum number ✓ **Correct answer**
- C. Magnetic quantum number
- D. Spin quantum number

A. Size/energy of the shell.

B. Determines subshell shape (s spherical, p dumb-bell, d, f); correct.

C. Orientation of orbitals in space.

D. Electron spin direction.

Question 159 Chemistry

The electronic configuration for degenerated orbitals is explained by:

- A. Aufbau Principle
- B. $n + l$ rule
- C. Hund's rule ✓ **Correct answer**
- D. Pauli exclusion principle

A. Order of filling by increasing energy.

B. Energy ordering of subshells.

C. Degenerate orbitals are filled singly with parallel spins before pairing; correct.

D. No two electrons share all four quantum numbers (max two per orbital).

160 Chemistry

Maximum number of electrons which can be placed in one orbital is:

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

A. One electron leaves the orbital half-filled; two are allowed.

B. Two electrons with opposite spins (Pauli exclusion); correct.

C. Forbidden by Pauli exclusion.

D. Forbidden.

Question 161 Chemistry

Air is a mixture of gases. The molecules of air do notsettle down due to:

- A. Different molar mass
- B. Non polar nature of gases
- C. Presence of dust particles in air
- D. Elastic collision of gas molecules ✓ **Correct answer**

A. Would, if anything, favour separation by density, not mixing.

B. Irrelevant to settling.

C. Dust does settle; it does not keep gases mixed.

D. Continuous random motion and elastic collisions keep gas molecules dispersed (kinetic theory); correct as the paper's intended answer.

162 Chemistry

Collision shown by gases involve the following:

- A. No energy change ✓ **Correct answer**
- B. No pressure change
- C. Small energy change
- D. Large energy change

A. Ideal-gas collisions are perfectly elastic: total kinetic energy is conserved; correct.

B. Pressure is a bulk property of many collisions, not what a single collision "involves".

C. Elastic collisions lose no net kinetic energy.

D. That would be inelastic collision behaviour.

Question 163 Chemistry

According to Charles law volume of gas reduces to zero at:

- A. -12 O C
- B. 0 O C
- C. -273.15 O C ✓ **Correct answer**
- D. -210 O C

A. Working: $V \propto T(K)$; $V \to 0$ at $T = 0$ K = -273.15 °C (extrapolated). Not absolute zero.

B. 273 K, where volume is substantial.

C. Absolute zero; correct.

D. Still 63 K above absolute zero.

Question 164 Chemistry

The strongest hydrogen bond is present in:

- B. HF ✓ **Correct answer**
- C. H2O
- D. NH3

A. Sulphur is barely electronegative enough for H-bonding; very weak.

B. Fluorine is the most electronegative element, so the individual F–H···F bond is the strongest H-bond of the four; correct.

C. Water forms the most EXTENSIVE H-bond network, but each O–H···O bond is weaker than an F–H···F bond.

D. Nitrogen is less electronegative than O or F; weaker H-bonds.

Question 165 Chemistry

Which of the following has highest surface tension?

- A. Benzene
- B. Alcohols
- C. Ether
- D. Water ✓ **Correct answer**

A. Non-polar, weak intermolecular forces, low surface tension.

B. H-bonding, but weaker/less extensive than water.

C. Weak dipole forces, low surface tension.

D. Strong, extensive hydrogen bonding gives the highest surface tension of the list; correct.

Question 166 Chemistry

Which of the following has highest boiling point?

- B. C6H14
- C. C10H22 ✓ **Correct answer**
- D. C2H6

A. Working: for straight-chain alkanes, boiling point rises with chain length (stronger London dispersion forces, larger surface area). Lower than hexane/decane.

B. Higher than butane, lower than decane.

C. Largest molecule listed, highest boiling point; correct.

D. Smallest, lowest boiling point.

Question 167 Chemistry

Ice floats on the surface of water due to:

- A. Larger bond length
- B. Cubic structure of ice
- C. Weak intermolecular forces
- D. Empty spaces in the structure of ice ✓ **Correct answer**

A. Bond lengths do not explain the density anomaly.

B. Ordinary ice (Ih) is hexagonal, not cubic.

C. Ice's H-bonds are strong and directional.

D. The open H-bonded lattice holds molecules apart with cavities, making ice less dense (0.917 g/cm^3) than liquid water; correct.

Question 168 Chemistry

Which of the following is not oxidized by any oxidizing agent?

- A. Benzene ✓ **Correct answer**

- C. Ethylbenzene
- D. Xylene

A. The keyed answer: the unsubstituted aromatic ring resists oxidation under conditions that oxidise alkylbenzenes (its π system is stabilised).

B. Side chain oxidised to benzoic acid by $KMnO_4$ etc.

C. Side chain oxidised likewise.

D. Methyl side chains oxidised. Flagged: "not oxidized by ANY oxidizing agent" overstates it — benzene CAN be oxidised under drastic conditions; the answer is the textbook comparison, not an absolute fact. (Stem prints "Toulene".)

Question 169 Chemistry

The correct order of reactivity of hydrocarbons is:

- A. Alkanes > Alkynes > Alkenes
- B. Alkenes > Alkanes > Alkynes
- C. Alkynes > Alkenes > Alkanes
- D. Alkenes > Alkynes > Alkanes ✓ **Correct answer**

A. Reverses the true order: alkanes are least reactive.

B. Alkynes are more reactive than alkanes in addition reactions.

C. Alkynes' π electrons are held more tightly (sp carbon), so electrophilic addition is slower than for alkenes.

D. The standard order for electrophilic addition reactivity; correct.

Question 170 Chemistry

Reactivity of order of halogen acid is:

HCl > HBr > HI

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

A. Working: acid strength rises down the group as the H–X bond weakens (HF strongest bond, weakest acid). The reverse order.

B. Omits HF and misplaces HI.

C. Wrong order after HCl.

D. Correct.

Question 171 Chemistry

Alkyl halides are also known as Halogen derivatives of:

- A. Alkanes ✓ **Correct answer**
- B. Alkenes
- C. Alkynes
- D. Alcohols

A. Replacing H in an alkane by halogen gives an alkyl halide; correct.

B. Halogen derivatives of alkenes are alkenyl/vinyl halides.

C. Halogen derivatives are alkynyl halides.

D. Replacing OH by halogen gives an alkyl halide, but the textbook parent is the alkane.

Question 172 Chemistry

Grignard reagent is formed when alkyl halide reacts in the presence of halogen with:

- A. Calcium
- B. Potassium

- D. Magnesium ✓ **Correct answer**

A. Organocalcium compounds exist but are not Grignard reagents.

B. Gives organopotassium compounds, not Grignard reagents.

C. Gives organosodium (Wurtz-type) chemistry, not Grignard reagents.

D. R–X + Mg in dry ether → R–MgX, the Grignard reagent; correct.

Question 173 Chemistry

Phenols are very reactive towards:

- A. Oxidizing agent ✓ **Correct answer**
- B. Reducing agent
- C. Dehydrating agent
- D. Hygroscopic agent

A. The keyed answer: phenols are readily oxidised (to quinones/coloured products), which is why they darken in air.

B. Phenols are not notably reduced.

C. Phenols have no OH-bearing side chain to dehydrate.

D. Not a reactivity class for phenol. Flagged: phenols are also very reactive in electrophilic substitution (the ring is activated); the stem's intended contrast is with oxidising agents, so the answer rests on that framing.

Question 174 Chemistry

Both alcohols and phenols contain:

- A. – OH group ✓ **Correct answer**
- B. – COOH group

12 group

- D. – CHO group

A. Both carry the hydroxyl functional group (aliphatic in alcohols, aromatic in phenols); correct.

B. Carboxylic acids, not alcohols/phenols.

C. Present in many alcohols but not in phenol itself (C_6H_5OH).

D. Aldehydes.

Question 175 Chemistry

Select the correct order of relative acidic strength of phenol, alcohol, water, and carboxylic acid:

- A. Carboxylic acid > water > phenol > alcohol
- B. Carboxylic acid > phenol > water > alcohol ✓ **Correct answer**
- C. Carboxylic acid > alcohol > phenol > water
- D. Carboxylic acid > water > alcohol > phenol

A. Working: pKa ≈ carboxylic acid ~4–5, phenol ~10, water ~14 (15.7), alcohol ~16–18. Places water above phenol; wrong (phenol pKa 10 < water).

B. Correct order of decreasing acidity.

C. Places alcohol above phenol and water; wrong.

D. Places alcohol above phenol; wrong.

Question 176 Chemistry

Carboxylic acid reacts with Alcohol to form:

- A. Ester ✓ **Correct answer**
- B. Aldehyde

- D. Alkyl Halide

A. Fischer esterification (acid-catalysed): RCOOH + R′OH → RCOOR′ + H_2O; correct.

B. From oxidation/reduction of alcohols, not this reaction.

C. From oxidation of secondary alcohols.

D. From alcohol + HX/PCl_3 etc., not from a carboxylic acid.

Question 177 Chemistry

Catalytic reduction of Aldehyde & Ketone forms:

- A. Alcohol ✓ **Correct answer**
- B. Carboxylic acid
- C. Alkane
- D. Aldehyde

A. Catalytic hydrogenation reduces C=O to CH–OH: aldehydes → primary alcohols, ketones → secondary alcohols; correct.

B. An OXIDATION product of aldehydes.

C. Would need complete deoxygenation (e.g. Clemmensen), not ordinary catalytic reduction.

D. A starting material, not the reduction product.

Question 178 Chemistry

When Aldehyde reacts with 50% NaOH, this reaction is called as:

- A. 2, 4 – DNPH reaction
- B. Aldol condensation reaction
- C. Clemmensen reaction

nizarro's reaction ✓ **Correct answer**

A. A test for carbonyls (orange precipitate), not a NaOH reaction.

B. Needs an α-hydrogen and dilute base; non-enolisable aldehydes instead undergo Cannizzaro.

C. Reduction of carbonyls with Zn(Hg)/HCl.

D. Concentrated alkali disproportionates a non-enolisable aldehyde into alcohol + carboxylate; correct.

Question 180 Biology

Enzyme is a natural substance that:

- A. Increases the rate of chemical reaction ✓ **Correct answer**
- B. Decreases the rate of chemical reaction
- C. Has no effect on the rate of chemical reaction
- D. Stops the chemical reaction

A. Enzymes are biological catalysts that speed reactions without being consumed; correct.

B. Inhibitors slow reactions; enzymes as such speed them.

C. Contradicts the definition of a catalyst.

D. Enzymes never stop the reactions they catalyse.

Question 181 English

The word 'RITUAL' means:

- A. Original
- B. Religion
- C. Routine
- D. Custom ✓ **Correct answer**

iest", not the meaning of ritual.

B. Rituals occur in religions but the word means the practice itself, not religion.

C. Close, but routine is merely habitual; ritual carries a customary/ceremonial sense.

D. An established customary practice or ceremony; the best match; correct.

Question 182 English

Choose the correct spelling:

- A. Renessance
- B. Renaissance ✓ **Correct answer**
- C. Renaisance
- D. Reniassance

A. Missing the "ai".

B. Correct spelling (R-e-n-a-i-s-s-a-n-c-e).

C. Missing one "s".

D. "ia" transposed.

Question 183 English

Choose the correct spelling:

- A. Expident
- B. Expedent
- C. Expedient ✓ **Correct answer**
- D. Expediant

A. Missing the "e" after "d".

B. Missing the "i".

D. "ia" for "ie".

Question 184 English

Choose correct option from the following: Finally the accused was found guilty the crime.

- A. From
- B. Of ✓ **Correct answer**
- C. For
- D. To

A. "Guilty from" is not idiomatic.

B. The fixed collocation is "guilty of (the crime)"; correct.

C. "Guilty for" is not the standard collocation here.

D. "Guilty to" is not idiomatic.

Question 185 English

Choose the correct spelling:

- A. Defficiency
- B. Daficiency
- C. Deficiency ✓ **Correct answer**
- D. Defeciency

A. Double "f" is wrong.

B. "a" for "e".

C. Correct spelling.

D. "e" for "i" in the middle.

186 English

Hundreds of years old palace could not withstand the of heavy rain:

- A. Aftermath
- B. Havoc ✓ **Correct answer**
- C. Annoyance
- D. Massacre

A. The consequences AFTER an event, not the destructive force itself.

B. Widespread destruction/damage; "the havoc of heavy rain" fits; correct.

C. Too weak a word for destroying a palace.

D. Mass killing of people; wrong semantic field. (The stem omits a noun after "the" — "the [havoc] of heavy rain" is the intended reading.)

Question 187 English

He began to the heap of corns very carefully.

- A. Assess
- B. Inspect ✓ **Correct answer**
- C. Analyze
- D. Evaluate

A. To judge value/quality; less apt for simply looking over a heap.

B. To examine closely and carefully; the intended verb; correct.

C. To break down in detail; too technical for looking at a heap.

D. To judge worth; like "assess", it implies appraisal, not examination.

188 English

How cold the night is! Which kind of sentence is it?

- A. Interrogative
- B. Declarative
- C. Exclamatory ✓ **Correct answer**
- D. Imperative

A. Asks a question; this sentence asks nothing.

B. States a neutral fact; this expresses strong feeling.

C. Expresses strong feeling with an exclamation mark; correct.

D. Gives a command; this commands nothing.

Question 189 English

Identify the errors in the sentence to choose the correct option from below:

- A. Tennis gives you plenty of exercise it develops quickness of eye, and limb. It calls your brain your thinking power into action.
- B. Tennis gives you plenti off exercise, it develops quickness of eye, limb. It calls your brain, your thinking power intoo action.
- C. Tennis gives you plenty of exercise, It develops quickness of eye, limb. It calls your brane, your thinking power over action.
- D. Tennis gives you plenty of exercise; It develops quickness of eye and limb. It callsyour brain, your thinking power into action. ✓ **Correct answer**

A. Run-on sentence (two main clauses joined with no punctuation) and a faulty list ("eye, and limb").

B. Misspellings ("plenti", "off", "intoo") and faulty punctuation.

C. Misspelling ("brane"), wrong preposition ("over action"), capital "It" after a comma.

option. semicolon joins the clauses and "eye and limb" is correctly paired. Flagged: D itself contains a spacing defect ("callsyour") and a capital "It" after the semicolon, so it is the LEAST wrong option, not a clean sentence; the answer rests on the paper's key.

Note: Promoted SINGLE-SOURCE -> VERIFIED on the 5 Nov 2026 sprint addendum's worked derivation + Purdue OWL semicolon rule; D is the least-wrong option (it still prints 'callsyour' and a capital 'It' after the semicolon).

Question 190 English

It good players who bring good name to a country.

- A. Was
- B. Were
- C. Is ✓ **Correct answer**
- D. Are

A. Past tense; the sentence is a general present-tense statement.

B. Past plural; wrong tense and number for the cleft.

C. The cleft "It is ... who ..." takes singular "is" regardless of the following plural noun; correct.

D. Plural verb does not fit the "It ..." cleft frame.

Question 191 English

I don’t think I be able to go.

- A. Can
- B. Should
- C. Shall ✓ **Correct answer**
- D. must

ink I can be able to go" is ungrammatical (can + be able to is redundant).

B. Expresses advice/obligation, not future inability.

C. "I don't think I shall be able to go": the standard (formal) expression of future inability; the keyed answer.

D. Expresses obligation, not inability. Flagged: in modern usage "will" (not offered) is the usual choice; "shall" is the paper's formal convention.

Question 192 English

Ethics important for a peaceful and loving society.

- A. Have
- B. Has
- C. Are
- D. Is ✓ **Correct answer**

A. Plural verb; "ethics" as a field takes a singular verb here.

B. Singular, but "ethics has important" is ungrammatical without an adjective complement structure; "is" is the copula needed.

C. Plural; wrong for the singular field noun.

D. "Ethics is important...": singular copula agreeing with the field noun; correct.

Question 193 English

Engineers working on a new project for the last three days.

- A. Are
- B. Has been
- C. Have been ✓ **Correct answer**
- D. Ought to be

s are working" lacks the "for the last three days" duration structure (needs present perfect continuous).

B. Singular; does not agree with plural "Engineers".

C. "Engineers have been working... for the last three days": present perfect continuous, correct.

D. Changes the meaning to obligation.

Question 194 English

The word ‘CREDENTIALS’ means:

- A. Trust
- B. Qualifications ✓ **Correct answer**
- C. Credits
- D. Beliefs

A. Confidence, not credentials.

B. Certificates/evidence of suitability for a role; the standard meaning; correct.

C. Academic credits or money owed; not the meaning.

D. Convictions; unrelated.

Question 195 English

Identify the errors and choose the correct option:

- A. The wind blew, the rain fell, and the lightening flashed. ✓ **Correct answer**
- B. The wind blue the rain fell, and the lightening flashed.
- C. The wind blew, the rain fell and le lightening flashed.
- D. The wind blew the rain fell, and the lightening Flashed.

A. Correctly punctuated list of three clauses (commas + "and"); correct as the keyed

ugh "lightening" (making lighter) is printed for "lightning" (the flash) throughout — a defect in the original paper, preserved as printed.

B. "blue" for "blew" and a missing comma.

C. "le" for "the" and a missing Oxford comma structure.

D. Missing comma after "blew" and wrong capital "Flashed".

Question 196 English

Choose the correct option: Negotiations between the two sides have .

- A. Broken off
- B. Broken down ✓ **Correct answer**
- C. Broken up
- D. Broken in

A. Means stopped abruptly; used of talks, but the idiom for failed negotiations is "break down".

B. Negotiations that have collapsed/failed: "have broken down"; correct.

C. Dispersed (a crowd, a meeting); not the idiom for negotiations failing.

D. To interrupt or to wear in (shoes); does not fit.

Question 197 English

Choose the correct sentence:

- A. Your voice was recognized by me at once. ✓ **Correct answer**
- B. All her boats has been lost in the storm.
- C. A committee of five were appointed.
- D. The crowd were very big.

A. Grammatically correct passive sentence; correct.

s": plural subject with singular verb; wrong.

C. "committee ... were": collective noun treated as singular here ("was appointed" is the standard form); wrong as printed.

D. "crowd were": singular collective with plural verb; "was" is standard here; wrong.

This paper remains the paper of Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU). Ranjha Solutions branding is on this solved presentation only — the paper is not owned by Ranjha Solutions. SZABMU publishes no past papers officially.

Past papers are **free** — no charge is taken from any student for papers. Answers are as of the 2022 sitting.

Source: https://mdcatpapers.com/past-papers/2023/szabmu (accessed 31 Oct 2026, re-fetched 8 Nov 2026). See the source note on this page about the excluded questions and the 8 Nov 2026 decisions.