KMU MDCAT 2024, Paper A — Solved Past Paper

Body: Khyber Medical University (KMU), Khyber Pakhtunkhwa · **Post:** MDCAT (Medical & Dental College Admission Test), Paper A · **Year:** 2024 · **Questions:** 200 in the original paper — **193 solved and verified**, 7 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 2024 sitting.

Source note: Primary source: mdcatpapers.com transcription of KMU MDCAT 2024 Paper A (accessed 31 Oct 2026), transcribed word for word, 195 questions. Second source: KMU MDCAT 2024 Code D printing (same 200-question paper, different question order), used ONLY to recover the 5 questions missing from the transcription (R1–R5) and to confirm the 200-question total. Every answer was checked by worked derivation or reference fact, independently of the transcription's marked answer. 7 questions are DEFECTIVE-excluded by the assistant's decision under the owner's 8 Nov 2026 delegation (37be precedent): Q26, Q38, Q50, Q55, Q69, Q139, R3 — see the excluded list. Numbering follows the file: transcription order Q1–Q195, printed numbers shown where the stem carries one (Q144–Q173 = printed 147–176); R1–R5 sit in a labelled appendix with their Code D numbers and unknown Paper A positions; do NOT renumber.

Question Q1 Biology

The genetic code of _____ is bound by a lipid membrane?

- A. Enterovirus
- B. Flu virus ✓ **Correct answer**
- C. Hepatitis A virus

o virus

A. Enteroviruses are non-enveloped: their protein capsid has no lipid membrane around it, so the genetic code is not membrane-bound.

B. Influenza virus is enveloped; a lipid membrane taken from the host cell surrounds its capsid, so this is correct.

C. HAV is non-enveloped, like the other picornaviruses listed.

D. Poliovirus is a non-enveloped enterovirus; it has a bare capsid with no lipid envelope.

Question Q2 Biology

Viruses Can NOT _____.

- A. Crystalize
- B. Excrete ✓ **Correct answer**
- C. Infect bacteria
- D. Mutate

A. Viruses CAN be crystallised (Stanley crystallised tobacco mosaic virus); crystallisation is a property of their regular protein structure, not a life process.

B. Viruses have no metabolism of their own and no excretory machinery, so they cannot excrete; correct.

C. Bacteriophages are viruses that infect bacteria, so this is something viruses can do.

D. Viral genomes mutate, often rapidly, so mutation is something viruses do.

Question Q3 Biology

Where are the enzymes required for the replication of HIV virus located?

- A. In the protein spikes
- B. Surrounding the viral core

de the capsid ✓ **Correct answer**

- D. Outside the capsid

A. The spikes (gp120/gp41) are attachment proteins on the envelope; they carry no replication enzymes.

B. The enzymes are not arranged around the core; they are packaged within it.

C. Reverse transcriptase, integrase and protease travel inside the capsid/core with the RNA genome, ready to act on entry; correct.

D. Enzymes outside the capsid would be lost on entry and could not start replication.

Question Q4 Biology

The process of ATP synthesis through a combination of electrochemical and osmotic events is known as:

- A. Fermentation
- B. Glycolysis
- C. Oxidative phosphorylation ✓ **Correct answer**
- D. Oxidation of pyruvate to acetyl CoA

A. Fermentation makes ATP by substrate-level phosphorylation without an electron-transport chain or proton gradient.

B. Glycolysis makes a small net ATP gain by substrate-level phosphorylation in the cytoplasm; it uses no electrochemical gradient.

C. ATP synthase uses the proton electrochemical gradient across the inner mitochondrial membrane (an osmotic/electrical event) to make ATP; correct.

D. This link reaction produces NADH and CO_2 but synthesises no ATP itself.

Q5 Biology

Optimum pH for pancreatic lipase is:

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

A. pH 2 is stomach acidity; pancreatic lipase works in the small intestine, not the stomach, and is inactivated by strong acid.

B. Still acidic; pancreatic enzymes need the alkaline conditions produced by bile and pancreatic juice.

C. Slightly acidic; below the enzyme's optimum, so activity is reduced.

D. Pancreatic lipase acts in the slightly alkaline small intestine (pH ≈ 8); correct.

Question Q6 Biology

Sugarcane contains _____.

- A. Fructose
- B. Glucose
- C. Ribose
- D. Sucrose ✓ **Correct answer**

A. Fructose is present in small amounts and is one half of the sucrose molecule, but it is not the stored sugar of cane.

B. Glucose occurs in small amounts and is the other half of sucrose, but it is not the main stored sugar.

C. Ribose is a pentose sugar of RNA, not a storage sugar of sugarcane.

D. Cane sap stores sucrose (a glucose–fructose disaccharide), which is extracted as cane

Question Q7 Biology

Sickle cell anaemia results from?

- A. Reduction in oxygen carrying capacity of haemoglobin
- B. Linkage between the polypeptide chains
- C. Single amino acid substitution in the haemoglobin molecule ✓ **Correct answer**
- D. Viral infections of RNA viruses

A. Reduced oxygen carriage is a CONSEQUENCE of the sickled cells, not the cause of the disease.

B. No abnormal linkage between chains causes sickle-cell anaemia; the defect is inside one chain.

C. Glutamate at position 6 of the β-chain is replaced by valine (one base change); this single substitution makes haemoglobin S, which polymerises and sickles the cells; correct.

D. Sickle-cell anaemia is inherited, not infectious.

Question Q8 Biology

Which is INCORRECT about the globular proteins?

- A. Abundantly found in hair ✓ **Correct answer**
- B. Are spherical in shape
- C. Have polypeptide chains
- D. Soluble in water

A. Hair is made of keratin, a FIBROUS protein, not globular; so this statement is incorrect, which is what the question asks.

B. Globular proteins fold into compact roughly spherical shapes; true.

s, globular included, are polypeptide chains; true.

D. Globular proteins are generally water-soluble (e.g. enzymes, haemoglobin); true.

Question Q9 Biology

What is the ester of fatty acids and long chain alcohol called?

- A. Acylglycerol
- B. Glycerol
- C. Phospholipid
- D. Wax ✓ **Correct answer**

A. An ester of fatty acids with GLYCEROL (a 3-carbon alcohol), i.e. a fat/oil, not a long-chain alcohol.

B. Glycerol is the alcohol itself, not the ester.

C. A phospholipid is a glycerol ester carrying a phosphate group; its alcohol part is glycerol, not a long-chain alcohol.

D. A wax is exactly an ester of a fatty acid with a long-chain alcohol; correct.

Question Q10 Biology

Lipids, which do not contain fatty acid are:

- A. Neutral lipids
- B. Phosphatidic acids
- C. Steroids ✓ **Correct answer**
- D. Waxes

A. Neutral lipids (triglycerides) are built from fatty acids esterified to glycerol, so they DO contain fatty acids.

B. These contain fatty-acid chains attached to a glycerol-phosphate backbone.

re built from a four-ring sterane skeleton with no fatty-acid chains at all; correct.

D. Waxes are fatty-acid esters, so they contain fatty acids.

Question Q11 Biology

The peptidoglycan cell wall is specific to.

- A. Amoeba
- B. Bacteria ✓ **Correct answer**
- C. Protozoa
- D. Virus

A. Amoebae have no cell wall at all, only a cell membrane.

B. Peptidoglycan (murein) is the defining wall polymer of bacteria; correct.

C. Protozoa lack peptidoglycan walls.

D. Viruses have no cell wall; they have a protein capsid, sometimes an envelope.

Question Q12 Biology

Where are spindle fibres attached on a chromosome during cell division

- A. Centromere ✓ **Correct answer**
- B. Histone proteins
- C. Nucleolus
- D. Telomere

A. Spindle microtubules attach at the kinetochore, a protein structure built on the centromere; correct.

B. Histones package DNA into nucleosomes all along the chromosome; they are not the spindle attachment site.

olus makes ribosomal RNA, it disassembles during division and attaches to nothing.

D. Telomeres cap the chromosome ends and protect them; spindle fibres do not attach there.

Question Q13 Biology

Which organelle contribute towards steroid production?

- A. Endoplasmic Reticulum ✓ **Correct answer**
- B. Golgi apparatus
- C. Lysosome
- D. Ribosomes

A. The SMOOTH endoplasmic reticulum synthesises lipids and steroids (e.g. in adrenal and gonad cells); correct.

B. The Golgi modifies, sorts and packages proteins and lipids but does not synthesise steroids.

C. Lysosomes digest material with hydrolytic enzymes; they make no steroids.

D. Ribosomes synthesise proteins, not lipids or steroids.

Question Q14 Biology

The lysosomes found in eukaryotes contain:

- A. Hydrolytic enzymes ✓ **Correct answer**
- B. Meiotic enzymes
- C. Oxidative enzymes
- D. Mitotic enzymes

A. Lysosomes are sacs of acid hydrolases that break down macromolecules by hydrolysis; correct.

o class of "meiotic enzymes" stored in lysosomes; meiosis uses nuclear enzymes.

C. Oxidative enzymes (e.g. catalase, oxidases) belong mainly to peroxisomes and mitochondria, not lysosomes.

D. Mitosis is driven by kinases and microtubule motors in the cytoplasm/nucleus, not by lysosomal contents.

Question Q15 Biology

Plasma membrane is differentially permeable membrane due to the presence of?

- A. Carbohydrates
- B. Lipids ✓ **Correct answer**
- C. Proteins
- D. Vitamins

A. Surface sugars act as recognition markers (glycocalyx); they do not create the permeability barrier.

B. The phospholipid bilayer is the barrier itself: its hydrophobic interior blocks most polar solutes, making the membrane selectively permeable; correct.

C. Channel and carrier proteins DO control what crosses, but the question's intended answer is the lipid bilayer that forms the barrier; proteins sit in it rather than forming it.

D. Vitamins are not structural components of the membrane.

Question Q16 Biology

The following function/activity is NOT controlled by the autonomic nervous system.

- A. Cardiac muscles contraction
- B. Salivation
- C. Smooth muscles contraction

ughts and emotions ✓ **Correct answer**

A. Heart rate and contraction are regulated by the autonomic (sympathetic/parasympathetic) system.

B. Salivary glands are under autonomic control.

C. Smooth muscle of gut, vessels and airways is autonomically controlled.

D. These are conscious, higher cortical/limbic functions, not autonomic; correct.

Question Q17 Biology

A motor neuron:

- A. Carries impulse from effectors to CNS
- B. Carries impulse from receptors to CNS
- C. Carries impulse from CNS to muscles ✓ **Correct answer**
- D. Connects sensory nerves to ganglions.

A. Impulses travel FROM the CNS to effectors, not the reverse; this describes nothing.

B. That is a SENSORY neuron, not a motor neuron.

C. Motor (efferent) neurons carry commands from the CNS to muscles and glands; correct.

D. Interneurons/relay neurons connect sensory and motor pathways; ganglia are relay stations, not what defines a motor neuron.

Question Q18 Biology

Diffusion _____ across the post synaptic membrane causes it to depolarise:

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

s the PRESYNAPTIC terminal to trigger transmitter release; it does not depolarise the postsynaptic membrane.

B. Cl^- influx hyperpolarises (inhibits) the postsynaptic membrane.

C. K^+ leaves the cell during repolarisation; K^+ influx does not depolarise.

D. Na^+ influx through ligand-gated channels makes the inside less negative, i.e. depolarises; correct.

Question Q19 Biology

A reflex action, does not involve the:

- A. Brain ✓ **Correct answer**
- B. Motor neuron
- C. Sensory neuron
- D. Spinal cord

A. A simple spinal reflex arc runs receptor → sensory neuron → spinal cord → motor neuron → effector; the brain is not needed for the immediate response (it is informed afterwards); correct.

B. The motor neuron carries the response out; it IS involved.

C. The sensory neuron carries the stimulus in; it IS involved.

D. The cord contains the relay/interneuron of the arc; it IS involved.

Question Q20 Biology

What happens to the enzyme after an enzyme-catalysed reaction?

- A. Reduced to inactive form
- B. Becomes inert
- C. Changes into substrate

d for another reaction ✓ **Correct answer**

A. Enzymes are not used up or reduced by the reaction they catalyse.

B. An enzyme emerges unchanged and active, not inert.

C. An enzyme never becomes its own substrate; it is a catalyst, not a reactant.

D. Catalysts are unchanged by the reaction and can catalyse again and again; correct.

Question Q21 Biology

Catalase can be activated at pH:

- A. 1
- B. 3
- C. 5
- D. 7 ✓ **Correct answer**

A. pH 1 is strongly acidic; catalase is denatured/inactive at such acidity.

B. Still strongly acidic; far below the optimum.

C. Mildly acidic; activity is well below optimum.

D. Catalase works best near neutral pH ≈ 7 (the pH of blood/tissues where it destroys hydrogen peroxide); correct.

Question Q22 Biology

Enzymatic activity can be inhibited by?

- A. Heavy metal ions ✓ **Correct answer**
- B. Methane
- C. Mutase
- D. Noble gases

as Hg^{++}, Pb^{++} and Ag^{+} bind sulphydryl groups and distort enzymes, inhibiting them; correct.

B. Methane is chemically inert under body conditions and does not inhibit enzymes.

C. A mutase is itself an ENZYME (it moves a functional group within a molecule), not an inhibitor.

D. Noble gases are inert and do not interact with enzymes.

Question Q23 Biology

A competitive inhibitor:

- A. Accelerates the chemical reaction
- B. Competes with the enzyme
- C. Is irreversible
- D. Is reversible ✓ **Correct answer**

A. Inhibitors slow reactions; they never accelerate them.

B. MISWORDED option (defect flagged): a competitive inhibitor competes with the SUBSTRATE for the enzyme's active site, not "with the enzyme".

C. Competitive inhibition is normally reversible: raising substrate concentration out-competes the inhibitor.

D. Competitive inhibitors bind non-covalently and reversibly to the active site; correct.

Question Q24 Biology

Wings of birds and that of flying lizards provide evidence of:

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

A. Birds and flying reptiles evolved wings independently for the same function (flight) from ancestors without wings; similar structures, different origins; correct.

B. Divergence is one ancestral structure diversifying (e.g. forelimbs of mammals); wings here did not diverge from a common winged ancestor.

C. The existence of independently evolved wings is itself evolutionary evidence.

D. The wings are analogous, not homologous; they do not share a winged common ancestor.

Question Q25 Biology

The embryological stages of _____ show similarity in anatomical features.

- A. All living things
- B. All non-vertebrates
- C. All vertebrates ✓ **Correct answer**
- D. Human, jelly fish and mouse

A. Plants, fungi and bacteria have no comparable embryonic stages.

B. Invertebrate embryos are extremely diverse (e.g. insect vs mollusc) and do not share one common pattern.

C. Vertebrate embryos pass through strikingly similar stages (notochord, pharyngeal pouches, tail); correct.

D. A jellyfish is not a vertebrate and its development shares no such pattern with mammals.

Question Q27 Biology

Which hormone stimulates the secretion of gastric juice?

lecystokinin

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

A. CCK acts mainly on the gall bladder and pancreas, not on gastric juice secretion.

B. Gastrin, from stomach G-cells, stimulates the gastric glands to secrete acid and pepsinogen; correct.

C. Insulin regulates blood glucose; it does not stimulate gastric juice.

D. Secretin stimulates bicarbonate-rich pancreatic juice and bile, and actually inhibits gastric acid.

Question Q28 Biology

In an inflammatory response, bradykinin causes?

- A. Activation of natural killer cells
- B. Blockage in blood vessels
- C. Constriction of blood vessels
- D. Leakage of fluid from blood vessels ✓ **Correct answer**

A. NK cells are activated by cytokines such as interferons, not by bradykinin.

B. Bradykinin does not block vessels; it increases their permeability.

C. Bradykinin is a vasodilator, the opposite of a constrictor.

D. Bradykinin increases vascular permeability, letting fluid leak out and causing swelling and pain; correct.

Question Q29 Biology

Which of the following is an example of passive immunity?

bodies from mother's milk ✓ **Correct answer**

- B. Previous chickenpox infection
- C. Inactivated polio vaccine
- D. Live polio vaccine

A. Ready-made maternal antibodies (IgA) are transferred to the baby, giving immediate temporary protection without the baby making its own antibodies: passive immunity; correct.

B. Natural infection makes the person produce their own antibodies and memory cells: active immunity.

C. A killed vaccine stimulates the recipient's own immune response: active immunity.

D. A live attenuated vaccine likewise triggers the recipient's own active response.

Question Q30 Biology

Bacteria that lack flagella are called?

- A. Amphitrichous
- B. Atrichious ✓ **Correct answer**
- C. Lopho
- D. Peritrichous

A. Flagella at BOTH ends of the cell; the opposite of flagella-less.

B. Printed "Atrichious" on the source (correct spelling: atrichous); bacteria with no flagella at all; correct.

C. Short for lophotrichous: a tuft of flagella at one end.

D. Flagella all over the cell surface.

Q31 Biology

Antibiotics can be used against:

- A. Herpes simplex
- B. Influenza
- C. Polio
- D. Salmonella typhi ✓ **Correct answer**

A. A virus; antibiotics do not kill viruses (antivirals such as acyclovir are different drugs).

B. A viral infection; antibiotics are ineffective against it.

C. A viral infection; no antibiotic acts on poliovirus.

D. A bacterium causing typhoid; antibiotics kill it; correct.

Question Q32 Biology

The _____ in semen facilitate the transport of sperms.

- A. Androgen
- B. Prostaglandins ✓ **Correct answer**
- C. Oxytocin
- D. Testosterone

A. Androgens are male sex hormones regulating sperm production and male traits; they do not transport sperm.

B. Prostaglandins in semen stimulate contractions of the female tract that help move sperm towards the egg; correct.

C. Oxytocin acts in childbirth and milk ejection; it is not the semen component that aids sperm transport.

D. The main androgen; a hormone, not a transport agent in semen.

Q33 Biology

The acidity of urine is neutralized by?

- A. Cowpers gland ✓ **Correct answer**
- B. Prostate gland
- C. Seminal vesicle
- D. Vas deferens

A. The bulbourethral (Cowper's) glands secrete alkaline mucus that neutralises traces of acidic urine in the urethra before ejaculation; correct.

B. The prostate adds alkaline fluid to semen, but the urine-neutralising mucus is the Cowper's secretion.

C. Seminal vesicles add fructose-rich fluid that nourishes sperm; they do not neutralise urethral urine.

D. The vas deferens is a transport duct for sperm; it secretes nothing that neutralises acid.

Question Q34 Biology

The corpus luteum is essentially formed from

- A. Graafian follicle ✓ **Correct answer**
- B. Ovum
- C. Oogonium
- D. Oocyte

A. After ovulation the ruptured Graafian (mature) follicle's remaining cells luteinise into the corpus luteum, which secretes progesterone; correct.

B. The ovum is the egg released at ovulation; it does not turn into the corpus luteum.

C. Oogonia are the early germ cells that give rise to oocytes, not to the corpus luteum.

D. The oocyte is the egg cell itself, released from the follicle; the corpus luteum forms

left behind.

Question Q35 Biology

The outer layer of uterus is called as:

- A. Endometrium
- B. Myometrium
- C. Mesometrium
- D. Perimetrium ✓ **Correct answer**

A. The INNER lining of the uterus, shed during menstruation.

B. The MIDDLE muscular layer that contracts in labour.

C. Part of the broad ligament supporting the uterus, not a wall layer of the uterus itself.

D. The outer serous coat of the uterus; correct.

Question Q36 Biology

____ is spread through sexual contact.

- A. Gonorrhoea ✓ **Correct answer**
- B. Influenza
- C. Tuberculosis
- D. Typhoid

A. A bacterial sexually transmitted infection spread by sexual contact; correct.

B. Spread by respiratory droplets, not sexually.

C. Spread by airborne droplets from the lungs, not sexually.

D. Spread by contaminated food and water (faecal–oral), not sexually.

Q37 Biology

The cells contained in the lacunae of the bone are called

- A. Chondrocytes
- B. Osteoblast
- C. Osteocytes ✓ **Correct answer**
- D. Osteoclast

A. Cartilage cells, found in lacunae of CARTILAGE, not bone.

B. Bone-forming cells that sit on bone surfaces; once walled into lacunae they become osteocytes.

C. Mature bone cells that live in the small lacunae of the bone matrix and maintain it; correct.

D. Large multinucleate cells that RESORB bone; they sit in pits on the surface, not in lacunae.

Question Q39 Biology

What happens to calcium when skeletal muscles recover from contraction?

- A. Released from the sarcoplasmic reticulum
- B. Released from the myosin head
- C. Pumped into the sarcoplasmic reticulum ✓ **Correct answer**
- D. Exchanged for sodium ions

A. Release of Ca^{2+} from the sarcoplasmic reticulum STARTS contraction; recovery is the reverse.

B. Calcium does not sit on the myosin head; it binds troponin on actin.

C. During relaxation, Ca^{2+}-ATPase pumps calcium back into the sarcoplasmic reticulum, cytosolic Ca^{2+} falls, and the muscle relaxes; correct.

exchange drives skeletal-muscle relaxation.

Question Q40 Biology

Which of the following blood groups has anti-A and anti-B antibodies in the serum?

- A. A
- B. AB
- C. B
- D. O ✓ **Correct answer**

A. Group A blood has anti-B antibodies only (it carries A antigens).

B. Group AB has NEITHER anti-A nor anti-B antibodies.

C. Group B blood has anti-A antibodies only.

D. Group O red cells carry no A or B antigens, so the plasma contains BOTH anti-A and anti-B antibodies; correct.

Question Q41 Biology

What is the primary outcome of crossing over during prophase of meiosis I?

- A. Chromosomes duplicate without any exchange of parts
- B. Homologous chromosomes exchange different pairs leading to recombinant chromatids and increased genetic variation ✓ **Correct answer**
- C. Homologous chromosomes exchange identical parts, resulting in no genetic variation
- D. Non-homologous chromosomes exchange part

A. Duplication happens in S phase before meiosis; crossing over is precisely an exchange.

B. Non-sister chromatids of homologous chromosomes swap segments, producing recombinant chromatids and new gene combinations; correct.

nged segments carry different alleles, so the result IS new variation.

D. Crossing over is between HOMOLOGOUS chromosomes; exchange between non-homologues is a translocation, not crossing over.

Question Q42 Biology

The genetic makeup that your parents have transferred to you for your hair color, makes up your:

- A. Genotype ✓ **Correct answer**
- B. Karyotype
- C. Phenotype
- D. None of the above

A. The inherited set of genes (alleles) for a trait is the genotype; correct.

B. The karyotype is the number and appearance of the CHROMOSOMES, not the gene set for one trait.

C. The phenotype is the OBSERVABLE trait (the hair colour itself), not the genetic makeup behind it.

D. Wrong, because genotype is the correct term.

Question Q43 Biology

Carnivorous plants have evolved mechanisms for trapping and digesting small animals. The product of this digestion is used to supplement the plant's supply of:

- A. Carbohydrates
- B. Lipids
- C. Nitrites ✓ **Correct answer**
- D. Water

A. The plant makes its own carbohydrates by photosynthesis; prey is not eaten for sugar.

t digested to supply the plant with lipids.

C. The intended key: prey digestion supplies NITROGEN compounds (the paper prints "nitrites" for the nitrogenous nutrient); carnivorous plants live in nitrogen-poor soil and gain nitrogen from prey; correct as printed.

D. The plant absorbs water through its roots; prey is not a water source.

Question Q44 Biology

Which is true for an X linked dominant trait?

- A. All female offspring of the affected father will be affected ✓ **Correct answer**
- B. Half of the female offsprings of the affected father will be affected
- C. No male offspring of an affected mother will be affected
- D. No female offspring of the affected father will be affected

A. A father gives his only X chromosome to every daughter; if it carries a dominant trait, every daughter receives and shows it; correct.

B. That ratio applies to an affected heterozygous MOTHER, not to an affected father.

C. Wrong: sons get their X from their mother, so an affected mother passes the trait to her sons.

D. The exact opposite of the true pattern.

Question Q45 Biology

Malpighian tubules are found in:

- A. Earthworm
- B. Grasshopper ✓ **Correct answer**
- C. Leech
- D. Slug

excrete through nephridia (metanephridia), not Malpighian tubules.

B. Malpighian tubules are the excretory organs of insects, including grasshoppers; correct.

C. Leeches are annelids with nephridia, like earthworms.

D. Slugs are molluscs; they excrete through nephridia (kidneys), not Malpighian tubules.

Question Q46 Biology

Shark belongs to class_____

- A. Chondrichthyes ✓ **Correct answer**
- B. Echinodermata
- C. Osteichthyes
- D. Urochordata

A. Cartilaginous fishes: sharks, rays and skates, whose skeleton is cartilage; correct.

B. Starfish, sea urchins and sea cucumbers; spiny-skinned marine invertebrates, not fishes.

C. Bony fishes, with a bony skeleton; sharks are not bony fishes.

D. Tunicates (sea squirts), sac-like chordates; not fishes at all.

Question Q47 Biology

Canal system is a characteristic of?

- A. Cnidarians
- B. Protozoans
- C. Porifera ✓ **Correct answer**
- D. Segmented worms

A. Jellyfish, corals and hydra have a gastrovascular cavity, not a canal system.

ed organisms, they have no multicellular canal system.

C. Sponges move water through ostia, canals and the spongocoel to the osculum: the canal system; correct.

D. Annelids have a gut, blood vessels and nephridia, but no sponge-like canal system.

Question Q48 Biology

Mantle is the feature of?

- A. Annelids
- B. Chordates
- C. Echinoderms
- D. Mussel ✓ **Correct answer**

A. Segmented worms have no mantle.

B. Chordates (including us) have no mantle.

C. Starfish and kin have no mantle.

D. The mantle is the molluscan tissue fold that secretes the shell; a mussel is a mollusc; correct.

Question Q49 Biology

The production of energy is_____.

- A. Faster in anaerobic respiration ✓ **Correct answer**
- B. Faster in aerobic respiration
- C. Same in both types of respiration
- D. Not associated with respiration

A. Glycolysis/fermentation regenerates ATP quickly because it is a short pathway with no electron-transport chain; the RATE of ATP production is higher, even though the yield per

r lower.

B. Aerobic respiration is more EFFICIENT (about 36–38 ATP per glucose vs 2), but slower per unit time.

C. Rate and yield both differ between the two pathways.

D. Energy (ATP) production is the very purpose of respiration.

Question Q51 Biology

Chromosome is typically made up from a combination of?

- A. DNA and protein ✓ **Correct answer**
- B. DNA and RNA
- C. RNA and lipids
- D. RNA and proteins

A. Chromosomes are chromatin: DNA wrapped around histone (and other) proteins; correct.

B. RNA is not a structural component of chromosomes (a little RNA is associated, but it is not what chromosomes are "made up" of).

C. Neither RNA nor lipids form the chromosome's structure.

D. Chromosomes contain DNA, not RNA, as their genetic material.

Question Q52 Biology

Which cytoplasmic organelle make their own proteins?

- A. Chromosomes
- B. Golgi apparatus
- C. Mitochondria ✓ **Correct answer**
- D. Smooth endoplasmic reticulum

somes are not cytoplasmic organelles and do not make proteins.

B. The Golgi modifies and packages proteins made elsewhere; it synthesises none itself.

C. Mitochondria have their own DNA and ribosomes and synthesise some of their own proteins; correct.

D. The smooth ER makes lipids and detoxifies; it has no ribosomes and makes no proteins.

Question Q53 Biology

The active mass movement of mitochondria in the cytoplasm is due to

- A. Cyclosis ✓ **Correct answer**
- B. Endoplasmic streaming movements
- C. Golgi apparatus
- D. Transfer RNA

A. Cytoplasmic streaming (cyclosis) sweeps organelles, including mitochondria, around the cell in bulk flow; correct.

B. Another name for the same streaming phenomenon, but the paper's key term is cyclosis.

C. The Golgi packages and ships vesicles; it does not move mitochondria.

D. tRNA carries amino acids to ribosomes; it moves nothing in bulk.

Question Q54 Biology

Which part of the brain is controlling your sense of balance?

- A. Amygdala
- B. Cerebellum ✓ **Correct answer**
- C. Hippocampus
- D. Medulla Oblongata

dala processes emotion (especially fear), not balance.

B. The cerebellum coordinates posture, balance and fine movement using vestibular and proprioceptive input; correct.

C. The hippocampus is for memory formation, not balance.

D. The medulla controls autonomic functions (breathing, heart rate, blood pressure), not balance.

Question Q56 Biology

Most of the neurons in the CNS are?

- A. Bipolar
- B. Multipolar ✓ **Correct answer**
- C. Pseudounipolar
- D. Unipolar

A. Bipolar neurons (one axon, one dendrite) are found in special senses (retina, olfactory epithelium), not most of the CNS.

B. Most CNS neurons (e.g. motor neurons, interneurons) have one axon and many dendrites: multipolar; correct.

C. Typical of dorsal-root-ganglion sensory neurons, not of most CNS neurons.

D. Unipolar neurons are rare in vertebrates and are not the CNS majority.

Question Q57 Biology

The enzymes enable the conversion of substrates into products by

- A. Changing equilibrium in the direction of the substrate
- B. Increasing the activation energy
- C. Increasing the substrate concentration

…vering the activation energy ✓ **Correct answer**

A. Enzymes do not change the equilibrium position; they only speed up reaching it.

B. Raising the activation energy would slow the reaction; enzymes do the opposite.

C. Enzymes do not work by raising substrate concentration; they provide an alternative pathway.

D. Enzymes stabilise the transition state, lowering the activation energy so more molecules can react; correct.

Question Q58 Biology

According to Lamarckism, the basis of evolution is:

- A. Inheritance of acquired characteristics ✓ **Correct answer**
- B. Mutation
- C. Natural selection
- D. Survival of the fittest

A. Lamarck proposed that traits acquired during life (use/disuse) are passed to offspring; correct.

B. Mutation is a source of variation in modern (Darwinian/synthetic) theory, not Lamarck's basis.

C. Darwin's mechanism, not Lamarck's.

D. A Darwinian/Spencerian phrase, not Lamarck's.

Question Q59 Biology

What best describes the hind leg bones seen in the whale?

- A. Analogous to the fin of living fish
- B. Fossil structure from an extinct ancestor

nologous structure of the wings of a bat

- D. Vestigial structures that had a function in an ancestor ✓ **Correct answer**

A. Fish fins are functional swimming structures; whale pelvic remnants are non-functional and are not analogous fins.

B. They are present in LIVING whales, not fossils.

C. They are homologous to the hind limbs of land mammals, not to bat wings.

D. Reduced pelvic/hind-limb bones in modern whales are remnants of the functional hind limbs of their terrestrial ancestors; correct.

Question Q60 Biology

Which is true about the cells found in gastric glands lining the stomach wall?

- A. Chief cells secrete gastrin
- B. Hormone cells secrete intrinsic factor
- C. Mucus cells secrete mucin ✓ **Correct answer**
- D. Parietal cells secrete pepsinogen

A. Chief (zymogenic) cells secrete PEPSINOGEN; gastrin comes from G-cells.

B. Intrinsic factor is secreted by PARIETAL cells, not by hormone cells.

C. Mucous neck cells secrete mucin, which forms the protective mucus layer; correct.

D. Parietal cells secrete HCl and intrinsic factor; pepsinogen comes from chief cells.

Question Q61 Biology

What directly triggers the activation of natural killer cells?

- A. Free radicals
- B. Hydrogen peroxide
- C. Interferons ✓ **Correct answer**

A. Free radicals damage cells; they do not activate NK cells.

B. H_2O_2 is a microbicidal oxidant used by phagocytes; it is not the NK activation signal.

C. Type I interferons (and IL-2/IL-15) released during viral infection enhance and activate NK-cell killing; correct.

D. Oxygen is not a signalling trigger for NK activation.

Question Q62 Biology

Which of the following is NOT true about plasmids found in streptococci?

- A. Carry fewer genes than the chromosome
- B. Replicate autonomously from the chromosome
- C. They are considered as genetic element
- D. The bacterial chromosome depends on plasmids for replication ✓ **Correct answer**

A. True: plasmids are small extra DNA circles carrying few genes.

B. True: plasmids have their own origin of replication.

C. True: plasmids are extrachromosomal genetic elements.

D. FALSE: the chromosome replicates independently; plasmids are dispensable extras. This is the NOT-true statement; correct. (The stem names streptococci, but the fact is general to bacterial plasmids.)

Question Q63 Biology

Which of the following bacteria produces endospores?

- A. Both gram negative and positive bacteria
- B. Gram negative

m positive ✓ **Correct answer**

- D. Mycobacteria

A. Endospore formation is not shared by both groups; it is essentially restricted to certain Gram-positives.

B. Gram-negative bacteria do not generally form endospores.

C. Endospores are formed by Gram-positive genera such as Bacillus and Clostridium; correct.

D. Mycobacteria are acid-fast rods; they do not form endospores (their resistance comes from their waxy wall).

Question Q64 Biology

_____ is used in the production of Humulin?

- A. Bacteria ✓ **Correct answer**
- B. Fungi
- C. Protozoa
- D. Virus

A. Humulin (recombinant human insulin) is produced by genetically engineered E. coli bacteria expressing the human insulin gene; correct.

B. Yeast CAN make recombinant insulin in some processes, but Humulin production uses bacteria.

C. Protozoa are not used for recombinant insulin production.

D. Viruses are not production hosts for Humulin.

Question Q65 Biology

Which of the following does NOT relate to smooth muscles?

trolled by the autonomic nervous system

- B. Have spindle shaped cells
- C. Line the wall of heart ✓ **Correct answer**
- D. Lack striations

A. True of smooth muscle: it is involuntary and autonomically controlled.

B. True: smooth-muscle cells are spindle-shaped with a single central nucleus.

C. The heart wall is CARDIAC muscle, not smooth muscle; this does NOT relate to smooth muscle; correct.

D. True: smooth muscle has no visible striations (no organised sarcomeres).

Question Q66 Biology

Which term best describes an organism's physical characteristic.

- A. Allele
- B. Genetic code
- C. Genotype
- D. Trait ✓ **Correct answer**

A. An allele is one variant form of a gene, not the characteristic itself.

B. The genetic code is the codon-to-amino-acid mapping, not a characteristic.

C. The genotype is the genetic makeup behind a characteristic, not the characteristic itself.

D. A trait IS the observable physical (or behavioural) characteristic; correct.

Question Q67 Biology

What will happen with the addition of salt to water?

- A. Water potential will increase
- B. Water potential will remain same

notic potential will increase ✓ **Correct answer**

- D. Osmotic potential will remain same

A. Wrong: adding solute LOWERS (makes more negative) the water potential.

B. Wrong: solute concentration changes water potential.

C. The marked key, reading "osmotic potential" as osmotic PRESSURE/strength, which rises as solute is added. NOTE (convention caveat): in the standard water-relations convention, solute (osmotic) potential Ψs BECOMES MORE NEGATIVE (decreases) when salt is added, while water potential falls with it; the key follows the loose "osmotic strength" reading.

D. Wrong under either reading: adding salt changes the solution's osmotic behaviour. PROMOTED to VERIFIED — 3737j-batch-addendum-2026-11-08.md (8 Nov 2026): Official KMU MDCAT 2024 key (Code A Q67 = c) + GauthMath + Aakash agree. Caveat: in the strict convention Ψs becomes more negative on adding salt; the paper uses the magnitude reading.

Question Q68 Biology

Which of the following is NOT true about viruses?

- A. Contain DNA
- B. Can replicate on their own ✓ **Correct answer**
- C. Can infect bacteria
- D. They have a sub-cellular structure

A. True for many viruses (DNA viruses); the statement is true of viruses as a group in the sense that some contain DNA.

B. FALSE: viruses are obligate intracellular parasites and must use a host cell's machinery to replicate; this is the NOT-true statement; correct.

C. True: bacteriophages infect bacteria.

ses are sub-cellular (acellular) entities, smaller and simpler than cells.

Question Q70 Chemistry

Heating 24.8g of copper carbonate (CuCO3) in a crucible produced only 13.9g of copper oxide (CuO). What is the percentage yield of copper oxide?

- A. 81.79%
- B. 83.98%
- C. 86.87% ✓ **Correct answer**
- D. 89.68%

A. Too low; does not match the stoichiometry.

B. Too low.

C. Matches the calculation; correct.

D. Too high.

Question Q71 Chemistry

Efficiency of chemical reaction can be checked by calculating

- A. Actual yield
- B. Theoretical yield
- C. Percentage yield ✓ **Correct answer**
- D. Amount of the reactant unused

A. The actual yield alone says nothing about efficiency without comparing it to what was possible.

B. The theoretical yield is the maximum possible; alone it does not measure efficiency.

C. (Actual ÷ theoretical) × 100 directly measures how efficiently the reaction ran; correct.

D. Unused reactant relates to incomplete reaction but is not the standard efficiency

Question Q72 Chemistry

Actual yield will reach the ideal (theoretical) value if the % yield of the reaction is,

- A. 10%
- B. 50%
- C. 90%
- D. 100% ✓ **Correct answer**

A. At 10% yield the actual yield is one-tenth of theoretical.

B. At 50% the actual yield is half the theoretical.

C. At 90% the actual yield is still short of theoretical.

D. Percentage yield = actual ÷ theoretical × 100, so 100% means actual = theoretical; correct.

Question Q73 Chemistry

Which of the following sub-shell does not exist?

- A. 1p ✓ **Correct answer**
- B. 1s
- C. 5d
- D. 6f

A. A p subshell needs n ≥ 2 (l = 1 requires n > l); n = 1 allows only l = 0 (s). So 1p cannot exist; correct.

B. Exists: the ground-state subshell of hydrogen.

C. Exists (n = 5, l = 2).

D. Exists in principle (n = 6, l = 3), though high in energy.

Q74 Chemistry

The splitting of spectral lines in magnetic field is

- A. Aufbau principle
- B. Pauli exclusion principle
- C. Stark effect
- D. Zeeman effect ✓ **Correct answer**

A. The building-up rule for filling orbitals; nothing to do with spectral splitting.

B. No two electrons share all four quantum numbers; not a splitting effect.

C. Splitting of spectral lines in an ELECTRIC field, not a magnetic field.

D. Splitting of spectral lines in a MAGNETIC field; correct.

Question Q75 Chemistry

Which element has the electronic configuration of noble-gas notation [Kr], 5s2, 4d?

- A. Mo
- B. Se
- C. Sr
- D. Zr ✓ **Correct answer**

A. Molybdenum is [Kr] $4d^5\ 5s^1$, a different d/s occupancy.

B. Selenium is [Ar] $3d^{10}\ 4s^2\ 4p^4$; a p-block element with no 4d electrons.

C. Strontium is [Kr] $5s^2$ with NO 4d electrons.

D. Zirconium (Z = 40) is [Kr] $4d^2\ 5s^2$, i.e. the printed "[Kr], 5s2, 4d" ($4d^2$ understood); correct.

Question Q76 Chemistry

Total number of electron pairs present in the valence shell of central atom in water are

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

A. That counts only the bonding pairs, forgetting the lone pairs.

B. No combination of bond/lone pairs in water gives 3.

C. 2 bonding pairs + 2 lone pairs = 4 pairs; correct.

D. Oxygen's valence shell holds at most 4 pairs (octet).

Question Q77 Chemistry

What is the mass of 1 mole of calcium carbonate ($CaCO_3$)?

- A. 50g
- B. 75g
- C. 100g ✓ **Correct answer**
- D. 125g

A. Half the molar mass.

B. No combination of the atomic masses gives 75.

C. Correct.

D. Too high by 25 g.

Question Q78 Chemistry

Which one of the following molecules has a zero-dipole moment?

- A. BF_3 ✓ **Correct answer**
- B. NF_3
- C. NH_3

A. Trigonal planar and perfectly symmetrical; the three B–F bond dipoles cancel, net dipole zero; correct.

B. Trigonal pyramidal with a lone pair; bond dipoles do not cancel; polar.

C. Trigonal pyramidal with a lone pair; polar.

D. Bent molecule; bond dipoles add, not cancel; polar.

Question Q79 Chemistry

The unhybridized p orbital in sp2 hybridization is

- A. In the same plane
- B. Out of the plane
- C. Parallel to sp2 orbitals
- D. Perpendicular to sp2 orbitals ✓ **Correct answer**

A. The three sp^2 hybrids lie in one plane; the leftover p orbital does not.

B. Loosely true but imprecise: "out of the plane" alone does not state the exact orientation the question asks for.

C. The p orbital is not parallel to the sp^2 hybrids; it is at right angles to their plane.

D. The unhybridised p orbital stands perpendicular to the plane of the three sp^2 orbitals (allowing π overlap above and below); correct.

Question Q80 Chemistry

760 torr is equal to ___ Pascal

- A. 1
- B. 76
- C. 760

325 ✓ Correct answer

A. 1 Pa is a tiny pressure; 760 torr is one atmosphere.

B. 76 is the number of centimetres of mercury, not pascals.

C. 760 is the value in torr/mmHg, not in pascals.

D. 1 atm = 760 torr = 101325 Pa exactly; correct.

Question Q81 Chemistry

How many grams of CO2 can be produced by thermally decomposing 10 moles of ZnCO3(s)?

- A. 320
- B. 360
- C. 400
- D. 440 ✓ **Correct answer**

A. Would be 10 mol of a 32 g/mol gas (O_2).

B. No matching stoichiometry.

C. Would be 10 mol at 40 g/mol.

D. Correct.

Question Q82 Chemistry

Molar heat of vaporization of water is

- A. 40.7 cal/mol
- B. 40.7 J/mol
- C. 40.7kcal/mol
- D. 40.7 kJ/mol ✓ **Correct answer**

ies is about 170 J, far too small.

B. Three orders of magnitude too small.

C. 40.7 kcal ≈ 170 kJ, about four times too large.

D. The accepted molar enthalpy of vaporisation of water at its boiling point (≈ 40.7 kJ/mol); correct.

Question Q83 Chemistry

Distillation under very reduced pressure is ____ distillation

- A. Destructive
- B. Fractional
- C. Steam
- D. Vacuum ✓ **Correct answer**

A. Destructive distillation breaks compounds down by strong heating (e.g. coal); pressure is not the point.

B. Fractional distillation separates by a fractionating column at (usually) normal pressure.

C. Steam distillation uses steam to carry over immiscible liquids; it is not defined by reduced pressure.

D. Distillation at very low pressure is vacuum distillation, which lowers boiling points so heat-sensitive liquids can be distilled; correct.

Question Q84 Chemistry

The example of metallic solid is

- A. B
- B. C
- C. Cu ✓ **Correct answer**

A. Boron is a metalloid forming a covalent network solid, not a metal.

B. Carbon (diamond/graphite) forms covalent network/layered solids, not metallic solids.

C. Copper has metallic bonding with delocalised electrons: the classic metallic solid; correct.

D. Silicon is a covalent network solid (diamond structure), a semiconductor, not a metal.

Question Q85 Chemistry

When a crystalline substance conducts current in one direction but not through other directions of the crystal, this property is

- A. Allotropy
- B. Anisotropy ✓ **Correct answer**
- C. Isomorphism
- D. Polymorphism

A. Different structural forms of the SAME element (e.g. diamond/graphite); not direction-dependence.

B. A property that differs with direction in a crystal, e.g. conductivity along one axis only; correct.

C. Different substances crystallising in the same form; not a directional property.

D. One substance crystallising in more than one form; not direction-dependence.

Question Q86 Chemistry

Forward reaction is the one that

- A. Is very slow at the beginning of the reaction
- B. Reacts to form reactants

eds up gradually and at equilibrium its rate becomes constant

- D. Takes place from left to right as given in chemical equation ✓ **Correct answer**

A. The forward rate is usually FASTEST at the start (reactant concentration highest), not slow.

B. Forming reactants is the REVERSE reaction.

C. The forward rate falls as reactants are used up; at equilibrium forward and reverse rates are equal, not "constant" in this sense.

D. By definition the forward reaction converts reactants (left) to products (right) as written; correct.

Question Q87 Chemistry

How many moles of NaCl are produced from 16.5g of HCl, according to the neutralization reaction? HCl(aq) + NaOH(aq) → NaCl(aq) + H2O(l)

- A. 0.252
- B. 0.452 ✓ **Correct answer**
- C. 0.652
- D. 0.852

A. Too low.

B. Correct.

C. Too high.

D. Too high.

Question Q88 Chemistry

In the production of SO3 from SO2 and Oxygen, the yield of SO3 is increased by

- A. Adding a catalyst

ing more SO_2 ✓ **correct answer**

- C. Increasing temperature
- D. Removing oxygen

A. A catalyst speeds up reaching equilibrium but does not change the equilibrium yield.

B. Adding a reactant shifts the equilibrium ($2SO_2 + O_2 \rightleftharpoons 2SO_3$) towards products by Le Chatelier's principle, increasing SO_3 yield; correct.

C. The forward reaction is exothermic, so higher temperature shifts equilibrium LEFT and reduces SO_3 yield.

D. Removing a reactant shifts equilibrium left, reducing yield.

Question Q89 Chemistry

Consider N2 + 3H2(g) ⇌ 2NH3(g) ΔH = −92.46 kJ/mol. The optimum temperature (°C), to produce ammonia is

- A. 450 ✓ **Correct answer**
- B. 500
- C. 5000
- D. Constant temperature

A. The Haber process uses ≈ 450 °C as the compromise: fast enough, yet not so hot that the exothermic equilibrium is driven too far back; correct.

B. 500 °C is used in some descriptions as the upper end, but 450 °C is the standard compromise value the paper intends.

C. Absurdly high; ammonia would not form at all.

D. Not a temperature value; every process needs a specified temperature.

Q90 Chemistry

The unit of Kc for the system PCl5 ⇌ PCl3 + Cl2 is

- A. dm^3/mol
- B. mol/dm^3 ✓ **Correct answer**
- C. mol/dm^6
- D. mol^2/dm^6

A. The reciprocal of the correct unit.

B. Correct.

C. Would fit a different stoichiometry (e.g. 3 products, 1 reactant).

D. The units of Kc for a reaction producing 2 concentration terms from none.

Question Q91 Chemistry

For a first order reaction A → B, the rate constant is 0.0458 s^{-1}. Calculate rate of the reaction if the concentration of reactant is 0.35 mol dm^{-3}.

- A. 0.012 mol dm^{-3} s^{-1}
- B. 0.014 mol dm^{-3} s^{-1}
- C. 0.016 mol dm^{-3} s^{-1} ✓ **Correct answer**
- D. 0.018 mol dm^{-3} s^{-1}

A. Too low.

B. Too low.

C. Correct.

D. Too high.

Q92 Chemistry

A reaction is first order with respect to A and second order with respect to B, the rate equation is

- A. Rate = k [A]
- B. Rate = k [A][B]
- C. Rate = k $[A]^2[B]$
- D. Rate = k $[A][B]^2$ ✓ **Correct answer**

A. Omits B entirely and gives overall order 1.

B. First order in both; overall order 2, not 3.

C. Reverses the orders (second in A, first in B).

D. First order in A, second order in B; overall order 3; correct.

Question Q93 Chemistry

What mass of aluminium oxide (Al2O3) is produced from 18.5g of Al metal, when it reacts completely with oxygen gas according to the following equation? 4Al(s) + 3O2(g) → 2Al2O3(s)

- A. 30.8g
- B. 32.6g
- C. 34.9g ✓ **Correct answer**
- D. 36.5g

A. Too low.

B. Too low.

C. Correct.

D. Too high.

Q94 Chemistry

Calculate the work done when 1 mole of an ideal gas expands from 15 dm^3 to 20 dm^3 against a constant external pressure of 2 atmospheres.

- A. -10 atm.dm^3 ✓ **Correct answer**
- B. -5 atm.dm^3
- C. 5 atm.dm^3
- D. 10 atm.dm^3

A. Correct.

B. Half the volume change.

C. Wrong sign and half the magnitude.

D. Right magnitude, wrong sign (that would be work done ON the gas).

Question Q95 Chemistry

When 1 mole of ice melts at 0°C and constant pressure of 1 atmosphere, 6025 J of heat is absorbed by the system. The molar volume of ice and water are 0.020 and 0.018 dm^3, respectively. Calculate ΔE. (1 dm^3.atm = 101.33 J)

- A. 6010.20 J
- B. 6015.20 J
- C. 6020.20 J
- D. 6025.20 J ✓ **Correct answer**

A. Subtracts far too much work.

B. Wrong work term.

C. Wrong work term.

D. Correct: melting slightly contracts the volume, so a tiny amount of work is done ON the system.

Q96 Chemistry

One slice of bread with a tablespoon of peanut butter on it contains 20g carbohydrate, 10g protein, and 9g fat. Calculate total energy consumed in this intake.

- A. 158 kcal
- B. 173 kcal
- C. 201 kcal ✓ **Correct answer**
- D. 218 kcal

A. Undercounts the fat contribution.

B. Wrong arithmetic.

C. Correct.

D. Overcounts.

Question Q97 Chemistry

ΔH can be measured indirectly by applying

- A. Avogadro's law
- B. Faraday's law
- C. Gas's law
- D. Hess's law ✓ **Correct answer**

A. Relates gas volume to moles; nothing to do with enthalpy.

B. Relates charge to moles in electrolysis; not enthalpy.

C. The gas laws relate P, V, T; they do not give ΔH.

D. Enthalpy is a state function, so ΔH for a reaction can be built from the ΔH values of other reactions; correct.

Q98 Chemistry

The heat of sublimation of potassium is 98 kJ/mol, the heat of dissociation of bromine gas is 192.5 kJ/mol. The ionization energy of K is 414 kJ/mol. The electron affinity of Br is −334.7 kJ/mol and the heat of formation of KBr is −405.8 kJ/mol. Calculate the lattice energy of KBr.

- A. −679.3 ✓ **Correct answer**
- B. −669.5
- C. 679.3
- D. 669.5

A. Correct (lattice energy released, hence negative).

B. Wrong arithmetic.

C. Right magnitude, wrong sign (lattice formation releases energy).

D. Wrong on both counts.

Question Q99 Chemistry

Which one of the following is a strong electrolyte in solution?

- A. Acetic acid
- B. Ammonium hydroxide
- C. Carbonic acid
- D. Potassium iodide ✓ **Correct answer**

A. A weak acid; only slightly ionised in water: weak electrolyte.

B. A weak base; slightly ionised: weak electrolyte.

C. A weak acid; slightly ionised: weak electrolyte.

D. An ionic salt that dissociates completely in water: strong electrolyte; correct.

Q100 Chemistry

When 4 g of magnesium was heated in excess of oxygen. Calculate the theoretical yield of magnesium oxide (MgO).

- A. 3.7g
- B. 4.2g
- C. 5.4g
- D. 6.6g ✓ **Correct answer**

A. Too low.

B. Too low.

C. Too low.

D. Correct.

Question Q101 Chemistry

The electrode potential of the standard hydrogen electrode is chosen as

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

A. Not the reference value.

B. By convention the standard hydrogen electrode is assigned exactly 0.00 V and all other electrode potentials are measured against it; correct.

C. Not the reference value.

D. Not the reference value.

Q102 Chemistry

Electronegativity of Al is approximately equal to that of

- A. B
- B. Be ✓ **Correct answer**
- C. Mg
- D. Na

A. Boron (2.04) is 0.43 above aluminium.

B. Beryllium (1.57) is only 0.04 from aluminium: the CLOSEST match, and the correct answer by the numbers; correct.

C. Magnesium (1.31) is 0.30 from aluminium: the printed key, but WRONG — not the closest.

D. Sodium (0.93) is 0.68 away. VERIFIED: Wikipedia data page (Pauling 1.57 vs Al 1.61) + LibreTexts — beryllium is the closest match to aluminium. The official KMU key (Code A Q102 = b, parsed 8 Nov 2026) confirms B.

Question Q103 Chemistry

Which of the following alkali metal forms only normal oxide with O2?

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

A. Potassium forms the superoxide KO_2 (and peroxide) with excess oxygen.

B. Lithium is small and forms ONLY the normal oxide Li_2O; correct.

C. Sodium forms the peroxide Na_2O_2 as its main product with oxygen.

D. Rubidium forms the superoxide RbO_2.

Q104 Chemistry

Third period element that initially reacts rapidly with oxygen to form a protective oxide coating that prevents further reactions is

- A. Al ✓ **Correct answer**
- B. Ar
- C. Na
- D. Si

A. Aluminium (period 3) at once forms a thin, tough, adherent Al_2O_3 layer that seals the metal from further attack (passivation); correct.

B. Argon is a noble gas; it does not react with oxygen at all.

C. Sodium (period 3) reacts violently and keeps reacting; it forms no protective coating.

D. Silicon does form a protective SiO_2 layer, but it reacts slowly, not rapidly, and the paper intends aluminium.

Question Q105 Chemistry

Cu2+ salt solution is blue in colour due to transition of electrons from

- A. d to d orbital ✓ **Correct answer**
- B. p to d orbital
- C. p to p orbital
- D. s to p orbital

A. Cu^{2+} (d^9) absorbs visible light when an electron jumps between split d orbitals (d–d transition), giving the blue colour; correct.

B. Not the transition responsible for the colour of Cu^{2+} solutions.

C. Not involved.

D. Not involved in transition metal colours.

Q106 Chemistry

Potassium ferrocyanide is which type of salt?

- A. Complex ✓ **Correct answer**
- B. Double
- C. Mixed
- D. Normal

A. $K_4[Fe(CN)_6]$ contains the complex ion $[Fe(CN)_6]^{4-}$, a coordination entity that stays intact in solution; correct.

B. A double salt (e.g. an alum) dissociates fully into simple ions; ferrocyanide does not.

C. A mixed salt contains two different anions/cations in simple form; not this.

D. A normal salt is a simple salt of an acid with no replaceable hydrogen; ferrocyanide is not simple.

Question Q107 Chemistry

Name of ketone functional group is

- A. Amino
- B. Carbonyl ✓ **Correct answer**
- C. Carboxyl
- D. Formyl

A. The $-NH_2$ group of amines, not ketones.

B. A ketone is a C=O group bonded to two carbons: the carbonyl group; correct.

C. The $-COOH$ group of carboxylic acids.

D. The $-CHO$ group of aldehydes.

Q108 Chemistry

Pyridine belongs to which class of organic compounds?

- A. Alicyclic
- B. Heterocyclic ✓ **Correct answer**
- C. Homocyclic
- D. Hydrocarbon

A. Alicyclic rings contain only carbon and are non-aromatic; pyridine's ring contains nitrogen.

B. Pyridine is a six-membered aromatic ring with ONE nitrogen atom in the ring: heterocyclic; correct.

C. Homocyclic rings contain only one kind of atom (carbon); pyridine's ring does not.

D. A hydrocarbon contains only C and H; pyridine contains nitrogen.

Question Q109 Chemistry

Which of the following elements cannot be detected directly in a given organic compound?

- A. Chlorine
- B. Nitrogen
- C. Oxygen ✓ **Correct answer**
- D. Phosphorous

A. Halogens are detected directly (e.g. silver nitrate test after fusion).

B. Detected by Lassaigne's test (Prussian blue).

C. Oxygen has no direct qualitative test in classical organic analysis; its presence is inferred (e.g. from the compound's behaviour); correct.

D. Phosphorus is detected by the ammonium molybdate test after fusion.

Q110 Chemistry

The homolytic fission of C-H bond in an alkane result in

- A. Alkyl free radical ✓ **Correct answer**
- B. Carbanion
- C. Carbocation
- D. Methylpropane

A. Homolytic fission splits the shared pair evenly, one electron to each fragment: the carbon fragment is an alkyl radical (plus H·); correct.

B. A carbanion (C^-) comes from HETEROLYTIC fission where carbon keeps both electrons.

C. A carbocation (C^+) comes from heterolytic fission where carbon loses both electrons.

D. A specific alkane molecule, not a fission product type.

Question Q111 Chemistry

Addition of HBr to isobutylene mainly gives

- A. isobutyl bromide
- B. n-butyl bromide
- C. sec-butyl bromide
- D. tert-butyl bromide ✓ **Correct answer**

A. The anti-Markovnikov skeleton; not the main product.

B. A straight-chain isomer; isobutylene's skeleton cannot give it.

C. Would need a secondary carbocation; isobutylene gives the more stable tertiary carbocation.

D. Markovnikov addition: H^+ adds to the CH_2 carbon, Br^- to the tertiary carbon via the tertiary carbocation; correct.

Q112 Chemistry

Dehydrohalogenation of alkylhalide is carried out in presence of

- A. Alcoholic KOH ✓ **Correct answer**
- B. Aqueous KOH
- C. Conc. H2SO4
- D. Zn dust

A. Alcoholic alkali favours ELIMINATION (dehydrohalogenation) to form alkenes; correct.

B. Aqueous alkali favours SUBSTITUTION, giving alcohols.

C. A dehydrating acid used for dehydrating ALCOHOLS, not for dehydrohalogenation of alkyl halides.

D. A reducing agent (e.g. for reducing nitro compounds), not an elimination reagent.

Question Q113 Chemistry

The carbon atom carrying positive charge and attached to three other atoms or groups is called

- A. Carbanion
- B. Carbene
- C. Carbocation ✓ **Correct answer**
- D. Oxonium

A. A carbon carrying a NEGATIVE charge.

B. A neutral carbon with only two bonds and a lone pair.

C. A positively charged carbon with three bonds (six valence electrons); correct.

D. A positively charged OXYGEN species (e.g. H_3O^+), not carbon.

Q114 Chemistry

Which of the following has the highest boiling point?

- A. ethyl alcohol
- B. isopropyl alcohol
- C. n-propyl alcohol ✓ **Correct answer**
- D. tert-butyl alcohol

A. Ethanol (C_2) is the smallest; bp ≈ 78 °C.

B. Branched C_3; branching reduces surface contact, bp ≈ 82 °C.

C. Straight-chain C_3, largest effective surface, strongest van der Waals forces plus H-bonding; bp ≈ 97 °C, the highest; correct.

D. Highly branched C_4; compact shape, bp ≈ 82 °C despite the extra carbon.

Question Q115 Chemistry

The reaction of an alcohol with sodium produces

- A. Aldehyde
- B. Alkoxide ✓ **Correct answer**
- C. Ethane
- D. Ethene

A. Aldehydes come from OXIDATION of primary alcohols, not from sodium.

B. $2ROH + 2Na \rightarrow 2RONa + H_2$: the sodium alkoxide salt plus hydrogen; correct.

C. An alkane; not a product of alcohol + sodium.

D. An alkene from dehydration of ethanol with acid, not from sodium.

Q116 Chemistry

Oxidation of secondary alcohol gives

- A. Carboxylic acid
- B. Ether
- C. Ketone ✓ **Correct answer**
- D. Phenol

A. Carboxylic acids come from oxidation of PRIMARY alcohols (via aldehydes), not secondary ones.

B. Ethers are made by dehydration/Williamson synthesis, not by oxidising a secondary alcohol.

C. The secondary carbon (bonded to two carbons) oxidises to C=O without breaking C–C bonds: a ketone; correct.

D. A benzene ring with −OH; unrelated to alcohol oxidation.

Question Q117 Chemistry

Which aldehyde is more reactive towards nucleophilic addition?

- A. Acetaldehyde
- B. Butyraldehyde
- C. Formaldehyde ✓ **Correct answer**
- D. Propionaldehyde

A. One methyl group donates electrons and crowds the carbonyl carbon, reducing reactivity.

B. A longer alkyl chain: more donation and steric hindrance; least reactive of the four.

C. No alkyl groups at all: the carbonyl carbon is most electrophilic and least hindered; correct.

roup reduces reactivity below formaldehyde and acetaldehyde.

Question Q118 Chemistry

Acetic acid can be prepared by the hydrolysis of

- A. Ethanal
- B. Ethanol
- C. Methanoic acid
- D. Methyl cyanide ✓ **Correct answer**

A. Ethanal is oxidised (not hydrolysed) to acetic acid.

B. Ethanol is oxidised to acetic acid; hydrolysis does not apply.

C. Methanoic (formic) acid is a different, one-carbon acid; it cannot hydrolyse into acetic acid.

D. Acetonitrile (CH_3CN) hydrolyses in acid to acetic acid (CH_3COOH): the nitrile carbon becomes the carboxyl carbon; correct.

Question Q119 Biology

Protein present in haemoglobin has _____ structure.

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

A. Primary structure is the amino-acid sequence of ONE chain; haemoglobin's defining feature is its assembly of chains.

B. Secondary structure is the α-helix/β-sheet folding within one chain.

C. Tertiary structure is the 3-D folding of ONE polypeptide; haemoglobin has four.

obin is two α and two β chains assembled together: quaternary structure; correct.

Note: Subject as tagged on the transcription: (as tagged on the transcription; sits between the Chemistry and Physics blocks)

Question Q120 Biology

In competitive inhibition, the inhibitor

- A. Binds with substrate
- B. Competes with enzyme
- C. Competes with substrate ✓ **Correct answer**
- D. Irreversibly binds with enzyme

A. The inhibitor does not bind the substrate; it binds the enzyme's active site.

B. Misworded: the inhibitor competes with the substrate FOR the enzyme, not with the enzyme itself.

C. The inhibitor resembles the substrate and competes with it for the active site; correct.

D. Competitive inhibition is normally reversible (see Q23).

Note: Subject as tagged on the transcription: (as tagged on the transcription)

Question Q121 Physics

A car is moving in a circular path at a constant speed. What provides the necessary centripetal force to keep the car moving in this path?

- A. The car's inertia resisting any change in direction
- B. The car's mass pulling it towards the centre of the circle
- C. The engine's power pushing the car forward
- D. The friction between the tyres and the road ✓ **Correct answer**

sists changes in motion, it provides no inward force.

B. Mass is not a force; gravity acts downwards, not towards the circle's centre.

C. The engine drives the car forward (tangentially), not sideways towards the centre.

D. Lateral (static) friction grips the road and supplies the inward centripetal force; correct.

Question Q122 Physics

Which of the following pairs correctly matches a physical quantity with its SI unit?

- A. Energy- Newton
- B. Force- Joule
- C. Power- Watt ✓ **Correct answer**
- D. Velocity-m/s^2

A. Energy is measured in joules; the newton is force.

B. Force is measured in newtons; the joule is energy.

C. Power (energy per second) is measured in watts; correct.

D. Velocity is m/s; m/s^2 is acceleration.

Question Q123 Physics

____ is the natural tendency of an object to remain at rest or in motion with constant velocity?

- A. Friction
- B. Inertia ✓ **Correct answer**
- C. Mass
- D. Weight

A. Friction OPPOSES motion; it is not the tendency to continue.

first law: the property of matter that resists any change in its state of motion; correct.

C. Mass MEASURES inertia, but the tendency itself is called inertia.

D. Weight is the gravitational force on a mass, not the tendency to continue moving.

Question Q124 Physics

A car in motion hits and gets crashed into a tree trunk, what is NOT conserved?

- A. Kinetic energy alone ✓ **Correct answer**
- B. Momentum alone
- C. Momentum and kinetic energy both
- D. Neither kinetic energy nor momentum

A. In this inelastic crash, kinetic energy is lost as heat, sound and deformation, while momentum of the closed system is conserved; so kinetic energy alone is not conserved; correct.

B. Momentum IS conserved (the tree + Earth absorb it).

C. Momentum is conserved, so "both not conserved" is wrong.

D. Wrong, because momentum is conserved.

Question Q125 Physics

The vertical and horizontal component of the projectile motion are

- A. Correlated with each other
- B. Dependent on each other
- C. Independent of each other ✓ **Correct answer**
- D. Associated with each other

A. The components share only the time of flight; neither determines the other.

l motion (constant velocity) does not depend on vertical motion (constant acceleration) and vice versa.

C. With no air resistance, horizontal and vertical motions proceed independently; correct.

D. Vague, and the precise physical statement is independence.

Question Q126 Physics

A ball is kicked horizontally from the top of a 10m high cliff with an initial speed of 15m/s. After 2 seconds, which of the following statement describes the ball's horizontal and vertical components?

- A. The horizontal velocity is 15m/s while vertical velocity is 20m/s downwards ✓ **Correct answer**
- B. The horizontal velocity is 15m/s while vertical velocity is 15m/s downwards
- C. The horizontal velocity is 30m/s while vertical velocity is 20m/s downwards
- D. The horizontal velocity is 15m/s while vertical velocity is 0m/s

A. Correct (using $g \approx 10\ m/s^2$).

B. The vertical speed after 2 s is not 15 m/s.

C. Horizontal velocity does not double.

D. The ball accelerates downwards from the start.

Question Q127 Physics

How does an angle between the force applied and the direction of motion influence the work done on an object?

- A. Work is constant regardless of the angle
- B. Work is maximum when the angle is 0° ✓ **Correct answer**
- C. Work is negative when the angle is 90°
- D. Work is 0 when the angle is 45°

Fd·cosθ depends on the angle.

B. cos 0° = 1, the full force acts along the displacement; correct.

C. At 90°, cosθ = 0, so work is ZERO, not negative (work is negative only beyond 90°).

D. At 45°, cosθ ≈ 0.707, so work is substantial, not zero.

Question Q128 Physics

A nurse is pushing a wheelchair with an 80kg patient sitting on it. How much work is done by the patient's weight?

- A. Half of the work
- B. Maximum work
- C. Minimum work
- D. No work ✓ **Correct answer**

A. No fraction of the work is done by weight; the weight is perpendicular to the motion.

B. Maximum work needs force along the displacement; weight is vertical, motion horizontal.

C. "Minimum" is not zero; the weight does exactly zero work here.

D. W = Fd·cos 90° = 0; correct (on flat ground with no vertical displacement).

Question Q129 Physics

If a constant force of 10N is applied to move an object 5m in the direction of the force, what is the work done?

- A. 2 J
- B. 5 J
- C. 15 J
- D. 50 J ✓ **Correct answer**

d, not F × d.

B. That is the distance alone.

C. That is F + d.

D. Correct.

Question Q130 Physics

The escape velocity of a body in the gravitational field of Earth is dependent on:

- A. Angle on which it is thrown
- B. Both mass of the body and the angle at which it is thrown
- C. Mass of earth ✓ **Correct answer**
- D. Mass of the body

A. Escape velocity v = √(2GM/R) has no angle term (ignoring air resistance).

B. Neither the body's mass nor the angle appears in the formula.

C. v_esc = √(2GM/R) depends on the Earth's mass M (and radius R); correct.

D. The body's own mass cancels out of the energy equation.

Question Q131 Physics

A wheel makes 3 complete revolutions. What is the total number of radians through which a point on wheel has rotated?

- A. 2π
- B. 3π
- C. 6π ✓ **Correct answer**
- D. 9π

A. One revolution only.

1.5 revolutions.

C. Correct.

D. Would be 4.5 revolutions.

Question Q132 Physics

For rigid body that rotates about a fixed axis, the angle swept out by a line passing through any point on the body and intersecting the axis of rotation perpendicularly is called?

- A. Angular acceleration
- B. Angular displacement ✓ **Correct answer**
- C. Angular momentum
- D. Angular velocity

A. The RATE of change of angular velocity, not the angle swept.

B. Exactly the angle through which the line rotates; correct.

C. A conserved quantity (Iω), not an angle.

D. The rate of change of angular displacement, not the displacement itself.

Question Q133 Physics

In a rotating spaceship, to produce artificial gravity, what does the centripetal force do?

- A. Has no effect inside the spaceship
- B. Increases spaceship's rotation
- C. Pulls objects towards the centre
- D. Pushes the objects towards the outer wall ✓ **Correct answer**

A. The rotation is felt inside; that is the whole point of artificial gravity.

B. The centripetal force does not spin the ship faster.

ctly, the centripetal force is the inward force (the wall pushing the occupant inward); the outward sensation is the fictitious centrifugal effect in the rotating frame.

D. The paper's intended key, describing the felt effect: occupants are pressed against the outer wall, which feels like gravity. The key is recorded as printed, with this terminology caveat. PROMOTED to VERIFIED — 37j-sprint-addendum-2026-11-05.md (5 Nov 2026): ScienceDirect artificial-gravity overview (the astronaut is "pressed toward the outer rim") + ScienceNewsToday (the force "pushes inhabitants toward the outer wall"). Caveat retained: strictly, the centripetal force is the inward force; the outward sensation is the centrifugal effect in the rotating frame.

Question Q134 Physics

When the mass of a body moving along a circle becomes half and radius becomes double, and v is constant, the centripetal force becomes?

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

A. Inverts the change.

B. Accounts for the mass change only.

C. Correct.

D. Ignores both changes.

Question Q135 Physics

What happens when two waves of the same frequency and amplitude meet in phase?

- A. They cancel each other out resulting in a destructive interference
- B. They combine to form a wave double the amplitude, resulting in constructive

- C. They produce a wave with zero amplitude
- D. They produce a wave with the same amplitude as the individual waves

A. Cancellation is destructive interference, which needs a 180° (out-of-phase) meeting.

B. In-phase displacements add: A + A = 2A; correct.

C. That is the out-of-phase result.

D. The resultant is larger than either wave alone.

Question Q136 Physics

Which type of waves can be polarized?

- A. Longitudinal waves
- B. Mechanical waves
- C. Sound waves
- D. Transverse waves ✓ **Correct answer**

A. Oscillations are along the propagation direction, so there is no transverse direction to restrict: cannot be polarised.

B. Too broad: includes longitudinal mechanical waves (sound), which cannot be polarised.

C. Sound is longitudinal; it cannot be polarised.

D. Only transverse waves (oscillation perpendicular to travel) can be polarised; correct.

Question Q137 Physics

For longitudinal waves

- A. The particles of the medium oscillate perpendicular to the wave's propagation
- B. The particles of the medium remain stationary as the wave passes through
- C. The particles of the medium oscillate along the direction of the wave's

gation ✓ Correct answer

- D. Their velocity is enhanced when they travel through vacuum

A. That describes TRANSVERSE waves.

B. Particles oscillate about fixed positions; they do not stay still.

C. Compressions and rarefactions travel as particles vibrate parallel to the wave; correct.

D. Longitudinal (mechanical) waves need a medium and cannot travel through a vacuum at all.

Question Q138 Physics

According to the principle of superimposition, when 2 or more waves overlap at a point in space, the amplitude of the resultant wave at that point is

- A. Always zero
- B. The product of the individual wave amplitude
- C. The product of the frequencies of the individual waves
- D. The sum of the amplitudes of the individual waves ✓ **Correct answer**

A. Only for exact destructive cancellation, not in general.

B. Displacements ADD, they are not multiplied.

C. Frequencies are not multiplied in superposition.

D. The algebraic sum of the displacements at that point; correct.

Question Q140 Physics

A police car, with its siren on, is moving towards a stationary listener. How does the stationary listener receive the frequency of the sound emitted by the siren? It

- A. Decreases
- B. Increases ✓ **Correct answer**

- D. Varies randomly

A. Frequency decreases when the source moves AWAY.

B. Approaching source compresses the wavefronts, so the listener hears a higher frequency (Doppler effect); correct.

C. The observed frequency changes with relative motion.

D. The shift is systematic, not random.

Question Q141 Physics

In an adiabatic process, how does the temperature of a gas change as its volume decreases?

- A. The temperature decreases
- B. The temperature increases ✓ **Correct answer**
- C. The temperature remains constant
- D. The temperature first increases then decreases

A. That happens in adiabatic EXPANSION.

B. Adiabatic compression: no heat exchange, work done ON the gas raises its internal energy and temperature; correct.

C. That is an ISOTHERMAL process.

D. No such two-stage behaviour for a simple adiabatic compression.

Question Q142 Physics

During an isothermal expansion of an ideal gas, which of the following statement is true?

- A. Pressure and temperature of the gas increase

internal energy of the gas increases

- C. The temperature of the gas remains constant ✓ **Correct answer**
- D. The work done by the gas is zero

A. In expansion the pressure FALLS, and temperature stays constant.

B. For an ideal gas U depends only on T, which is unchanged, so ΔU = 0.

C. "Isothermal" means constant temperature, by definition; correct.

D. The gas expands and DOES work, absorbing an equal amount of heat.

Question Q143 Physics

Consider an ideal gas confined to the cylinder with a fixed piston, on heating the gas, all the heat supplied increases

- A. Kinetic energy of the molecules ✓ **Correct answer**
- B. Potential Energy of the molecules
- C. The intermolecular forces between gas molecules
- D. The number of gas molecules

A. An ideal gas has no intermolecular potential energy, so added heat (at fixed volume, no work) goes entirely into molecular kinetic energy (temperature rises); correct.

B. Ideal-gas molecules have negligible intermolecular potential energy.

C. Ideal gases are defined as having negligible intermolecular forces.

D. Heating does not change the number of molecules.

Question Q144 (printed 147) Physics

What is the increase in force between two charges if the separation between them is decreased by 50 percent?

- A. Becomes four times ✓ **Correct answer**

- C. Increases by half
- D. Triples

A. Correct.

B. Would follow a 1/r law, not $1/r^2$.

C. No basis in Coulomb's law.

D. No basis in Coulomb's law.

Question Q145 (printed 148) Physics

According to Coulomb's law, what happens to the electrostatic force between the 2-point charges if the distance between them is doubled?

- A. The force becomes one-fourth ✓ **Correct answer**
- B. The force becomes half
- C. The force doubles
- D. The force remains the same

A. Correct.

B. Would follow a 1/r law.

C. The force falls, not rises, with distance.

D. Ignores the inverse-square law.

Question Q146 (printed 149) Physics

What does one Coulomb represent in terms of charge?

- A. The amount of charge transported by a current of one Ampere in one second ✓ **Correct answer**
- B. The charge of one proton

charge of one electron

- D. The charge required to create a force of 1 Newton between two charges separated by 1 meter

A. Q = I·t, so 1 C = 1 A·s by definition; correct.

B. One proton carries ≈ 1.6×10^{-19} C, vastly smaller.

C. One electron carries ≈ -1.6×10^{-19} C.

D. That confuses the definition of the coulomb with Coulomb's force law; 1 C at 1 m from another 1 C gives a force of ≈ 9×10^{9} N, not 1 N.

Question Q147 (printed 150) Physics

Two points charges, +5μC and −5μC are placed at points A and B, respectively, which are separated by a distance 2d. What is the electric potential at the midpoint M of the line joining A and B?

- A. 2kQ/d
- B. kQ/d
- C. −kQ/d
- D. zero ✓ **Correct answer**

A. Would be the sum if both charges were positive.

B. Forgets one charge.

C. Wrong sign bookkeeping.

D. Correct: equal and opposite contributions cancel.

Question Q148 (printed 151) Physics

In the case of a parallel plate capacitor, when the distance between the two plates is reduced to half and the area of the plate doubled, the capacitance

creases four times ✓ **Correct answer**

- B. Increases six times
- C. Is doubled
- D. Remains the same

A. Correct.

B. No combination of the two changes gives 6.

C. Accounts for only one of the two changes.

D. Ignores both changes.

Question Q149 (printed 152) Physics

If the dielectric material between the plates of the capacitor is removed, what happens to the electric field between the plates?

- A. The electric field becomes zero
- B. The electric field decreases
- C. The electric field increases ✓ **Correct answer**
- D. The electric field remains the same

A. Removing the dielectric does not discharge the plates.

B. The dielectric REDUCES the field; removing it does the opposite.

C. For fixed plate charge, $E = \sigma/\varepsilon$; removing the dielectric lowers ε, so E rises; correct.

D. The dielectric changes the field, so removing it changes it too.

Question Q150 (printed 153) Physics

Capacitance of a capacitor increases with a decrease in:

- A. Dielectric constant
- B. Plate area

- D. Plate separation ✓ **Correct answer**

A. C ∝ κ, so decreasing κ DECREASES capacitance.

B. C ∝ A, so decreasing area decreases capacitance.

C. C ∝ ε, so decreasing permittivity decreases capacitance.

D. C = εA/d, so decreasing d INCREASES capacitance; correct.

Question Q151 (printed 154) Physics

The I-V Graph for a non-Ohmic material is always

- A. Curved ✓ **Correct answer**
- B. Horizontal
- C. Linear
- D. Perpendicular

A. Non-ohmic materials (filament lamps, diodes) have a resistance that changes with V or I, so the I–V graph is non-linear (curved); correct.

B. A horizontal line would mean constant current at all voltages, which is not the general case.

C. A straight line through the origin is the OHMIC case.

D. Not a description of any I–V characteristic.

Question Q152 (printed 155) Physics

Temperature coefficient of resistance is defined as increase in resistance per ohm original resistance per ___?

- A. Degree rise in temperature ✓ **Correct answer**
- B. Unit increase in electric current

- : decrease in capacitance
- D. Degree drop in temperature

A. $\alpha = \Delta R/(R_0 \cdot \Delta T)$: fractional resistance change per degree; correct.

B. Current does not define the temperature coefficient.

C. Capacitance is unrelated to resistance's temperature behaviour.

D. The coefficient is defined per degree change (rise); a "drop" is not the definition's wording.

Question Q153 (printed 156) Physics

For metals, the temperature coefficient of resistance is:

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

A. No metal has an infinite temperature coefficient.

B. Negative coefficients belong to semiconductors and insulators (e.g. thermistors), not metals.

C. In metals, heating increases lattice vibrations, scattering electrons more, so resistance rises: positive α; correct.

D. Zero would mean resistance never changes with temperature, which is false for metals.

Question Q154 (printed 157) Physics

If R1 and R2 are respectively the filament resistance of a 100-Watt bulb and 200-Watt bulb designed to operate on the same voltage, then power of:

- A. R1 is two times R2 ✓ **Correct answer**

- C. R2 is four times R1
- D. R1 is four times R2

A. Correct: the lower-wattage bulb has the higher resistance.

B. Inverted.

C. Squares the ratio wrongly.

D. Squares the ratio wrongly.

Question Q155 (printed 158) Physics

The maximum power transfer theorem states that maximum power is delivered to the load when

- A. The load resistance is half of the source resistance
- B. The load resistance is zero
- C. The load resistance is double the source resistance
- D. The load resistance is equal to the source resistance ✓ **Correct answer**

A. Not the maximum-power condition.

B. Zero load resistance short-circuits the source; all power is lost internally.

C. Less than maximum power reaches the load.

D. R_load = R_source (Thévenin resistance) maximises power in the load; correct.

Question Q156 (printed 159) Physics

Electron Volt (eV) is another unit of

- A. Charge
- B. Current
- C. Energy ✓ **Correct answer**

A. Charge is measured in coulombs.

B. Current is measured in amperes.

C. 1 eV is the energy gained by one electron crossing 1 volt (1.6×10^{-19} J); correct.

D. Power is measured in watts.

Question Q157 (printed 160) Physics

An electron is moving perpendicular to the magnetic field, which of the following is correct statement about electromagnetic force acting on the electron?

- A. Force acting is equal to electron charge
- B. Force acting is equal to the magnetic field strength
- C. Force acting is maximum ✓ **Correct answer**
- D. Zero force is acting on it

A. Force (newtons) cannot equal charge (coulombs); dimensionally wrong.

B. Force is qvB·sinθ, not B alone.

C. F = qvB·sinθ with θ = 90° gives sinθ = 1, the maximum value; correct.

D. Zero force occurs when motion is PARALLEL to the field (θ = 0°), not perpendicular.

Question Q158 (printed 161) Physics

For a positive charged particle (q) moving with a velocity (v) in a magnetic Filed of flux density B, the force (F) acting on the charge particle is given by the expression?

- A. F = Fv x B
- B. F = qv x B ✓ **Correct answer**
- C. F = v x B/q
- D. q = v x B/F

: F appears on both sides.

B. The magnetic Lorentz force, F = q(v × B); correct. (The stem prints "Filed" for "field" — defect flagged.)

C. Divides by q instead of multiplying.

D. A garbled rearrangement, dimensionally wrong.

Question Q159 (printed 162) Physics

Which of the following statement is true about the magnetic filed inside a solenoid?

- A. It is along the axis of the coil ✓ **Correct answer**
- B. It is circular around the wires
- C. It is strongest at the ends of the solenoid
- D. It is zero when current flows through it

A. Inside a long solenoid the field is nearly uniform and directed along its axis; correct. (The stem prints "filed" for "field" — defect flagged.)

B. That describes the field close to a single straight wire, not inside a solenoid.

C. The field is strongest and most uniform in the INTERIOR; it weakens and spreads at the ends.

D. Current is exactly what CREATES the field; with no current the field is zero.

Question Q160 (printed 163) Physics

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

- A. 12 V ✓ **Correct answer**
- B. 19.4 V
- C. 20.6 V

A. Correct.

B. No matching product.

C. No matching product.

D. No matching product.

Question Q161 (printed 164) Physics

The inductance of a coil depends on.

- A. Number of turns ✓ **Correct answer**
- B. Resistance of the wire used
- C. Type of insulation used on the wire
- D. Voltage applied to the coil

A. Inductance $L \propto N^2$ (with geometry and core material); the number of turns is the key construction factor listed; correct.

B. Resistance affects losses, not inductance.

C. Insulation affects breakdown voltage and spacing, not inductance itself.

D. Applied voltage drives current; it does not change the coil's inductance.

Question Q162 (printed 165) Physics

The direction of induced current is determined by?

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

agnetic fields to currents, it does not give induced-current direction.

B. Gives the MAGNITUDE of induced emf (rate of flux change), not its direction.

C. The induced current flows so as to oppose the change in flux that produced it: this fixes its direction; correct.

D. Relates V, I and R; it says nothing about induction direction.

Question Q163 (printed 166) Physics

Lenz's law is consistent with the

- A. Ampere's Law
- B. Faraday's law
- C. Law of conservation of energy ✓ **Correct answer**
- D. Ohm's law

A. A law about magnetic fields from currents, not about energy bookkeeping.

B. Lenz's law COMPLEMENTS Faraday's law (magnitude vs direction) but is not "consistent with" it in the sense asked; the energy law is the intended answer.

C. If the induced current aided the change, energy would be created from nothing; Lenz's opposition is energy conservation at work; correct.

D. Unrelated to induction.

Question Q164 (printed 167) Physics

The basic principle behind the operation of the transformer is

- A. Coulomb's law
- B. Electromagnetic induction ✓ **Correct answer**
- C. Gas's Law
- D. Hess's law

tics, transformers use changing magnetic flux, not static charges.

B. A changing flux in the primary induces an emf in the secondary (mutual induction); correct.

C. Gas laws have nothing to do with transformers.

D. A thermochemistry law; irrelevant.

Question Q165 (printed 168) Physics

When the PN junction is reverse-biased, its reverse current is of the order of:

- A. Gigamperes
- B. Kiloamperes
- C. Megaamperes
- D. Microamperes ✓ **Correct answer**

A. 10^9 A: absurdly large; a junction would vaporise.

B. 10^3 A: far too large for a reverse saturation current.

C. 10^6 A: far too large.

D. Reverse saturation current is tiny (microamperes or less, from minority carriers); correct.

Question Q166 (printed 169) Physics

The momentum of moving photon is:

- A. mc^2
- B. λ / h
- C. h / λ ✓ **Correct answer**
- D. zero

A. That is rest-mass ENERGY (and a photon has no rest mass).

ocal of the correct expression.

C. Photon momentum p = E/c = h/λ (de Broglie relation); correct.

D. A photon carries momentum (radiation pressure proves it); it is not zero.

Question Q167 (printed 170) Physics

In every instant of time, wavelength associated with a freely falling body:

- A. Decreases ✓ **Correct answer**
- B. Increases two times
- C. Increases four times
- D. Remains constant

A. De Broglie wavelength λ = h/p; as the body falls its speed and momentum grow, so λ shrinks continuously; correct.

B. λ falls, not rises.

C. λ falls, not rises.

D. Momentum changes under gravity, so λ cannot stay constant.

Question Q168 (printed 171) Physics

As per 2nd photoelectric experiment, photoelectric effect does not occur if the frequency of the incident light is?

- A. Below the threshold frequency ✓ **Correct answer**
- B. Equals the threshold frequency
- C. Three times the threshold frequency
- D. Twice the threshold frequency

A. Photons below the threshold carry less than the work function, so no electron is emitted however bright the light; correct.

the threshold, emission just begins (zero kinetic energy).

C. Well above threshold; emission occurs.

D. Above threshold; emission occurs.

Question Q169 (printed 172) Physics

If an electron in the hydrogen atom jumps from second to first orbit, the emitted radiation has a wavelength of?

- A. 4/3RH ✓ **Correct answer**
- B. 3/4RH
- C. RH
- D. 4RH

A. Correct, read as 4/(3R_H) (the Lyman-alpha wavelength, 121.6 nm).

B. The reciprocal of the correct value.

C. Dimensionally wrong (a wavelength, not a constant).

D. Wrong by a factor of $3R_H^2$.

Question Q170 (printed 173) Physics

Black body is an ideal radiator that radiates _____ at all wavelengths

- A. Inconsistently
- B. Distinctly
- C. Equally ✓ **Correct answer**
- D. Unequally

A. Not the paper's wording.

B. A black body emits a continuous spectrum, not distinct lines.

's intended key, from the loose textbook phrase that a black body radiates at all wavelengths. NOTE: physically the emitted spectrum follows Planck's law and is NOT equal at all wavelengths (it peaks at one wavelength); the key is recorded as printed, with this caveat. PROMOTED to VERIFIED — 37j-wave20-addendum-2026-11-02.md (2 Nov 2026): Britannica ("Such an ideal object absorbs and thus emits radiation of all frequencies equally and fully. A radiator/absorber of this kind is called a blackbody") + OpenStax College Physics glossary ("blackbody: an ideal radiator, which can radiate equally well at all wavelengths"). Caveat retained: "equally" is the ideal-radiator definition (emissivity 1 at all wavelengths), not a claim of equal intensity at every wavelength.

D. Physically the more accurate description, but not the paper's key.

Question Q171 (printed 174) Physics

Mass number A refers to _____

- A. Number of electrons
- B. Number of nucleons ✓ **Correct answer**
- C. Number of neutrons
- D. Number of protons

A. Electron count equals proton count in a neutral atom, not the mass number.

B. A = protons + neutrons, the total nucleons in the nucleus; correct.

C. Neutrons alone are N = A − Z.

D. Protons alone are the atomic number Z.

Question Q172 (printed 175) Physics

λ is a _____ constant:

- A. Decay ✓ **Correct answer**
- B. Dielectric

- D. Proportionality

A. In the radioactive decay law $N = N_0e^{(-\lambda t)}$, λ IS the decay constant: the physically correct reading of the stem as printed; correct.

B. The dielectric constant is κ (kappa), not λ.

C. Printed "Plank's" (Planck's): Planck's CONSTANT is h, not λ; λ denotes wavelength in Planck's relations (E = hc/λ). The printed key confuses the symbol with the constant.

D. λ is not called a "proportionality constant" in any standard usage. VERIFIED: $N = N_0e^{(-\lambda t)}$ — LibreTexts + WikiLectures; λ is the decay constant. The official KMU key (Code A Q172 = a, parsed 8 Nov 2026) confirms A.

Question Q173 (printed 176) Physics

Gamma ray camera can observe radiations from the ____ that are concentrated in the organs

- A. Atoms
- B. Isotopes ✓ **Correct answer**
- C. Nucleons
- D. Neutrons

A. Too general: the camera detects radiation from a specific radioactive tracer, not atoms in general.

B. Gamma cameras image gamma rays from radioisotopes (radiotracers) concentrated in organs; correct.

C. Nucleons are protons/neutrons; they are not the clinical source term.

D. Neutrons are not what a gamma camera images.

Q174 English

A person who sells goods and services is a _____

- A. Consumer
- B. Purchaser
- C. Patron
- D. Vendor ✓ **Correct answer**

A. A consumer BUYS and uses goods; the opposite role.

B. A purchaser buys; the opposite role.

C. A patron is a customer/supporter, i.e. a buyer, not the seller.

D. A vendor sells goods or services; correct.

Question Q175 English

The detective noticed a subtle change in the suspect's tone when he asked about her whereabouts on the night of the crime, which hinted at something more significant. What does "subtle" most likely mean?

- A. Dramatic
- B. Notable
- C. Obvious
- D. Slight ✓ **Correct answer**

A. Dramatic means striking and obvious; the opposite of subtle.

B. Notable means worthy of attention, stronger and more obvious than subtle.

C. The opposite of subtle.

D. Subtle means delicate, faint, hard to notice: slight; correct.

Q176 English

Despite the complicated situation, she remained _____, calmly assessing her options before deciding. Fill in the blank with the appropriate choice:

- A. Composed ✓ **Correct answer**
- B. Erratic
- C. Frantic
- D. Hysterical

A. Composed means calm and in control, matching "calmly assessing her options"; correct.

B. Erratic means unpredictable and unsteady; the opposite of the described calm.

C. Frantic means wild with worry; contradicts "calmly".

D. Hysterical means wildly emotional; contradicts "calmly".

Question Q177 English

Find out synonym for "Elated"

- A. Confused
- B. Disappointed
- C. Nervous
- D. Overjoyed ✓ **Correct answer**

A. Confused means bewildered; unrelated to elation.

B. Disappointed is the opposite of elated.

C. Nervous means anxious; a different emotion.

D. Elated means extremely happy, thrilled: overjoyed; correct.

Q178 English

Choose the sentence with the correct tense and sentence structure:

- A. He is going to the market yesterday.
- B. I had been waiting for the bus, and it arrives.
- C. She will finish her homework before she went to bed.
- D. They were playing football when it started to rain. ✓ **Correct answer**

A. Present continuous "is going" clashes with "yesterday" (past).

B. Past perfect "had been waiting" clashes with present "arrives".

C. Future "will finish" clashes with past "went".

D. Past continuous for the ongoing action + past simple for the interrupting event: correct tense pairing; correct.

Question Q179 English

Choose the correct sentence:

- A. She didn't knew about the surprise party.
- B. She hasn't knew about the surprise party.
- C. She didn't know about the surprise party. ✓ **Correct answer**
- D. She doesn't know about the surprise party.

A. After "did", the base form is required: "didn't knew" is ungrammatical.

B. After "has", the past participle "known" is required: "hasn't knew" is ungrammatical.

C. Correct past-tense negative: auxiliary "did" + base form "know"; the intended key.

D. NOTE: this sentence is grammatically correct in the PRESENT tense; the key assumes a past-tense context, which the stem does not state. The key is recorded as intended, with this caveat. (The Code D printing gives option D as "She doesn't knew", which is ungrammatical — an option-content difference between the two printings, flagged in the

)MOTED to VERIFIED — 37j-wave16-addendum-2026-11-01.md (1 Nov 2026): in the Code D printing the same item appears as Q189 with option D "doesn't knew", which is ungrammatical, so option C is the ONLY grammatical sentence of the four and the answer is uniquely determined. The Paper A printing's option D ("doesn't know") is a variant printing that introduced the ambiguity; the second printing cures the transcription defect, disclosed here, not hidden.

Question Q180 English

After she _____ the stairs, her heart almost gave out from exhaustion.

- A. Has climbed
- B. Have climbed
- C. Had climbed ✓ **Correct answer**
- D. Was climbing

A. Present perfect; the sentence's main clause is past ("gave out"), so a past perfect is needed for the earlier action.

B. Wrong person/number as well as wrong tense ("she have" is ungrammatical).

C. Past perfect shows the climbing was completed before the heart "gave out"; correct.

D. Past continuous describes an ongoing action, not the completed climb before the later event.

Question Q181 English

Punctuate the given sentence correctly. The teacher asked did you complete your homework

- A. The teacher asked, did you complete your homework?
- B. The teacher asked, "Did you complete your homework?" ✓ **Correct answer**
- C. The teacher asked, "did you complete your homework".
- D. The teacher asked, did you complete your homework.

ech without quotation marks is incorrect.

B. Quotation marks, capital D, and the question mark inside the quotes: correct.

C. Lower-case "did" and a full stop instead of a question mark: incorrect.

D. No quotation marks and a full stop for a question: incorrect.

Question Q182 English

Punctuate the following sentence correctly. Lets meet at Sarahs house after school

- A. Let's meet at Sarah's house after school. ✓ **Correct answer**
- B. Let's meet at Sarahs house after school.
- C. Lets meet at Sarah's house after school.
- D. Let's meet, at Sarah's house after school.

A. Apostrophe in "Let's" (let us) and possessive "Sarah's", full stop, no stray comma; correct.

B. Missing the possessive apostrophe in "Sarahs".

C. Missing the apostrophe in "Lets".

D. An unnecessary comma after "meet". (The Code D printing gives option B as "Sarahs'" — an option-content difference between the two printings, flagged in the header.)

Question Q183 English

Do you usually take a bus..... the market?

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

A. "By bus" expresses the MEANS of travel, not the destination ("take a bus by the market"

B. "For" expresses purpose ("a bus for the market" is possible as a noun phrase, but "take a bus for the market" is not the idiom for destination).

C. "Of" cannot express destination here.

D. "Take a bus TO the market": the preposition of destination; correct.

Question Q184 English

I have been working _____ this project for two weeks.

- A. At
- B. By
- C. To
- D. On ✓ **Correct answer**

A. "Work at" takes a place or employer ("work at a bank"), not a project.

B. "By" does not collocate with "work" for a project.

C. "Work to" does not take a project as its object.

D. The idiomatic collocation is "work ON a project"; correct. (The Code D printing gives the stem with "He has been working" instead of "I have been working" — a stem difference between the two printings, flagged in the header; the answer is the same.)

Question Q185 English

Identify the sentence that contains an ERROR in word order, style, or vocabulary:

- A. He has a talent for solving complex problems.
- B. She enjoys reading, writing, and to paint. ✓ **Correct answer**
- C. The quick brown fox jumps over the lazy dog.
- D. They quickly adapted to the new environment.

cally correct.

B. Breaks PARALLELISM: the list mixes gerunds ("reading, writing") with an infinitive ("to paint"); it should be "reading, writing, and painting"; correct as the error.

C. The standard correct pangram.

D. Grammatically correct.

Question Q186 English

Identify the ERROR in the sentence: The chef quickly prepared, delicious and it served a meal.

- A. Punctuation ✓ **Correct answer**
- B. Style
- C. Vocabulary
- D. Word order

A. The intended key: the sentence's fault is the misplaced comma and broken structure ("prepared, delicious and it served").

B. Style is a matter of tone/register, not the sentence's actual fault.

C. No word is wrongly chosen; the words themselves are ordinary.

D. The word order is not the primary fault; the punctuation/structure is. NOTE: the sentence as printed is garbled, and the error categories overlap; the key is recorded as intended, with this caveat. PROMOTED to VERIFIED — 37j-sprint-addendum-2026-11-05.md (5 Nov 2026): Testpoint reproduces the exact item keyed "1. Punctuation" + the worked derivation in the file (misplaced comma breaks the sentence structure; no word is wrongly chosen and word order is not the fault). Caveat retained: Testpoint's own explanation text is muddled (it mentions word order); the key and the derivation agree on A.

Q187 English

Order is the law of civilization as chaos is the law of the _____. The most appropriate word to be filled in is:

- A. City
- B. Metropolis
- C. Universe
- D. Wilderness ✓ **Correct answer**

A. A city is a product of civilization, not the opposite of it.

B. A metropolis is a large city: again civilization, not its opposite.

C. The universe is neither order nor chaos in this contrast.

D. The analogy pairs order↔️civilization with chaos↔️wilderness (the uncultivated, unordered place); the intended key. NOTE: this is a literary analogy with no derivable answer; the key is recorded as intended, with this caveat. PROMOTED to VERIFIED — 37j-sprint-addendum-2026-11-05.md (5 Nov 2026): Testpoint reproduces the exact item keyed Wilderness + the analogy derivation (order↔️civilization pairs with chaos↔️wilderness). Caveat retained: a literary analogy, not a derivable fact; one prep-site reproduction only — FINAL under the owner's 8 Nov 2026 verification standard ("an answer confirmed by two sources or even one source is FINAL").

Question Q188 English

Blueprint is to architect as algorithm is to _____

- A. Designer
- B. Engineer
- C. Physician
- D. Programmer ✓ **Correct answer**

A. Designers use plans, but algorithms are specifically a programmer's working material.

use many kinds of plans; the algorithm–programmer link is the direct one.

C. Physicians do not work from algorithms as their defining tool.

D. A blueprint guides an architect's building; an algorithm guides a programmer's program; correct.

Question Q189 English

Which of the following words is a synonym for "meticulous"?

- A. Abhorrent
- B. Heedless
- C. Incautious
- D. Precise ✓ **Correct answer**

A. Abhorrent means detestable; unrelated.

B. Heedless means careless: the OPPOSITE of meticulous.

C. Incautious means careless: the opposite of meticulous.

D. Meticulous means very careful and precise about detail; correct.

Question Q190 Logical Reasoning

Find out the missing term in the sequence: 15, 14, 12, 9, ?

- A. 5 ✓ **Correct answer**
- B. 6
- C. 7
- D. 8

A. Correct.

B. Would need a difference of −3 again.

ed a difference of −2.

D. Would need a difference of −1.

Question Q191 Logical Reasoning

All omnivores are herbivores. No herbivores are carnivores. Some carnivores are humans. Which of the following conclusions are TRUE? CONCLUSIONS: I. Some humans are carnivores. II. No carnivores are omnivores. III. Some omnivores are carnivores.

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

A. Correct.

B. III is false.

C. III is false.

D. III is false. (The Code D printing gives option D as "III" alone — an option-content difference between the two printings, flagged in the header.)

Question Q192 Logical Reasoning

Read the following statements and identify the best cause-and-effect relation: I. Sara's productivity at work has significantly decreased over the past month. II. Sara has been experiencing frequent interruptions due to ongoing construction work near her office. Which of the following best describes the cause-and-effect relationship?

- A. Sara's decreased productivity is causing the construction work.
- B. The ongoing construction work is causing Sara's decreased productivity. ✓ **Correct answer**
- C. Sara's productivity was already decreasing before the construction work began.

construction work is unrelated to Sara's productivity.

A. Reverses the causation; Sara's output cannot cause building work.

B. The interruptions (II) plausibly explain the fall in productivity (I): II causes I; correct.

C. Nothing in the statements supports a prior decline.

D. The statements give a direct plausible link; "unrelated" ignores it.

Question Q193 Logical Reasoning

A store offers a 10% discount on all items. After applying the discount, the price of an item is Rs. 450. What was the original price of the item?

- A. Rs. 490
- B. Rs. 495
- C. Rs. 500 ✓ **Correct answer**
- D. Rs. 505

A. 490 × 0.9 = 441, not 450.

B. 495 × 0.9 = 445.50, not 450.

C. Correct.

D. 505 × 0.9 = 454.50, not 450.

Question Q194 Logical Reasoning

I went 10m to the East from my house, then turned north and walked another 15m, and then I turned west and covered 12m, and then turned south and covered 15m. How far am I from my house?

- A. 0 m
- B. 1 m
- C. 2 m ✓ **Correct answer**

A. Ignores the 2 m east–west difference.

B. No combination gives 1 m.

C. Correct.

D. No combination gives 3 m.

Question Q195 Logical Reasoning

If a>b, b>c, and d>a then?

- A. b<d ✓ **Correct answer**
- B. a<c
- C. b>d
- D. c>d

A. Correct.

B. False: a > b > c, so a > c.

C. False: d > b.

D. False: d > a > b > c, so c < d.

Question R1 Chemistry

The pKb of n-propyl amine is

- A. 3.24
- B. 3.28
- C. 3.32 ✓ **Correct answer**
- D. 3.35

A. Further from every published value than B or C.

key, from pKa 10.71 (Wikipedia / Vaia); now outvoted — the official key and three table values point to C.

C. Correct: the official key's answer, matching the experimental pKb 3.32 and closest to the ScienceDirect (3.33) and Engineering Toolbox (3.31) values.

D. Further from the published values than C. NOTE: published pKb values for n-propylamine span roughly 3.28–3.35 depending on the table; the decision follows the official key + the weight of the tables (3 for C, 1 for B). Caveat retained: the key table's Code D column was verified via its Code B column (4/4 match against the educationinkarachi Code B key), not independently cross-checked column by column. PICK-ONE decided by assistant under the owner's 8 Nov 2026 delegation (see 8 Nov 2026 batch addendum, appendix item 3).

Note: Appendix item, recovered from the Code D printing (Code D Q83); its position in Paper A order is UNKNOWN and is not guessed. PICK-ONE decided by assistant under the owner's 8 Nov 2026 delegation: C (3.32) — official KMU key Code D Q83 = c + experimental pKb 3.32 + ScienceDirect 3.33 + Engineering Toolbox pKa 10.69 (pKb 3.31); only Wikipedia/Vaia (pKa 10.71, pKb 3.29) point to the filed B. Table-dependence caveat retained in the file.

Question R2 Chemistry

Which one of the following molecules has a pyramidal structure?

- A. C2H4
- B. CH4
- C. H2O
- D. NH3 ✓ **Correct answer**

A. Ethene is PLANAR (trigonal planar around each carbon).

B. Methane is TETRAHEDRAL, not pyramidal.

C. Water is BENT (angular), not pyramidal.

is trigonal PYRAMIDAL (three N–H bonds plus one lone pair); correct.

Note: Appendix item, recovered from the Code D printing (Code D Q101); its position in Paper A order is UNKNOWN and is not guessed.

Question R4 English

"Regular exercise has been shown to improve overall health by reducing the risk of chronic diseases, such as heart disease and diabetes. Additionally, exercise enhances mental well-being by reducing stress, anxiety, and depression. Despite these benefits, many people find it challenging to maintain a consistent exercise routine due to busy schedules and a lack of motivation." Based on the paragraph, which of the following statements can be inferred?

- A. Busy schedules and lack of motivation are barriers to regular exercise. ✓ **Correct answer**
- B. Chronic diseases cannot be prevented by regular exercise.
- C. Exercise is only beneficial for physical health, not mental health.
- D. People who exercise regularly never experience stress or anxiety.

A. Stated directly in the last sentence ("challenging … due to busy schedules and a lack of motivation"); correct.

B. The paragraph says exercise REDUCES the risk; "cannot be prevented" contradicts it.

C. The paragraph explicitly adds mental well-being (stress, anxiety, depression).

D. An absolute claim the paragraph never makes; it says exercise reduces stress, not that it eliminates it.

Note: Appendix item, recovered from the Code D printing (Code D Q181); its position in Paper A order is UNKNOWN and is not guessed.

R5 English

Choose the correct sentence.

- A. My father was talking to his friend on mobile phone when I fall from the bicycle.
- B. My father is talking to his friend on mobile phone when I fall from the bicycle.
- C. My father was talking to his friend on mobile phone when I fell from the bicycle.
  ✓ **Correct answer**
- D. My father was talking to his friend on mobile phone when I am falling from the bicycle.

A. Past continuous + present simple "fall": tense mismatch.

B. Present + present is internally consistent, but it describes a present scene, not the past event the other options frame; the past-tense pairing is the intended correct sentence.

C. Past continuous for the ongoing action + past simple for the interrupting event: correct tense pairing; correct.

D. Past continuous + present continuous: tense mismatch.

Note: Appendix item, recovered from the Code D printing (Code D Q188); its position in Paper A order is UNKNOWN and is not guessed.

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Source: https://mdcatpapers.com/past-papers/2024/kmu-a (accessed 31 Oct 2026); second source (Code D printing, same paper, different question order): https://cdn.prod.website-files.com/6628ebd041f54989be2c9658/66f464c37e7c235cce499691_KMU%20MDCATVerD.pdf; official KMU answer key:

t-pedia.net/wp-content/uploads/2024/09/kmu-mdcat-paper-2024.pdf. See the source note on this page about the excluded questions and the numbering.