PMDC MDCAT (SZABMU) — GUESS PAPER 2027 · Predicted Questions

Body: Pakistan Medical & Dental Council (PMDC, SZABMU) · **Post:** MDCAT (Medical & Dental College Admission Test) · **Questions:** 200 predicted (Biology 90, Chemistry 50, Physics 40, English 10, Logical Reasoning 10) — 20 repeated questions, 160 verified facts predicted to recur, 20 syllabus anchors · **Price:** Free

GUESS PAPER — predicted questions for the next sitting, MDCAT 2027 (SZABMU), NOT a past paper. Every question below is a prediction: it is here because the same question, the same fact, or the same topic appeared in verified MDCAT (PMDC, SZABMU) past papers. **No pass guarantee.** A guess paper raises the odds; it does not promise a result. Answers are the best-supported answers, not exam keys.
Flag — this board's own sitting: the general all-boards MDCAT 2027 guess paper already exists and is live — THIS paper predicts SZABMU's own 2027 sitting, built ONLY on verified SZABMU past papers (2023, 2023 Code C, 2026 Code 2).

> **How to use this paper:** study the basis under each question, not just the answer — the real paper will ask the same topics in different words. Revise the underlying topic, not only the four options. Do not quote any item as "asked in the 2027 exam" — nothing here has been asked yet.

Question 1 Biology

Select an example of fibrous protein:

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

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

Why predicted [B] — Verified fact, predicted to recur: 37m Q39 (VERIFIED) — Collagen.

Question 2 Biology

Microscopic gap between the two neurons is called:

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

Why this answer? The junction/gap across which one neuron signals the next; correct.

Why predicted [A] — Repeated question: repeated — 37m Q12 and 37ahq Q77 all key Synapse. Also asked as: 37ahq Q77: "The junction between the axon ending of a neuron and the dendrites of another neuron is called:"

Question 3 Biology

Which of the following carbohydrates are sweetest among all?

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

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

Why predicted [B] — Verified fact, predicted to recur: 37m Q45 (VERIFIED) — Monosaccharides.

4 Biology

Most enzyme have an optimum temperature of around:

- A. 40 O C ✓ **Predicted answer**
- B. 50 O C
- C. 20 O C
- D. 30 O C

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

Why predicted [B] — Verified fact, predicted to recur: 37m Q19 (VERIFIED) — 40 O C.

Question 5 Biology

Which of the following is NOT a feature of cartilaginous joints?

- A. Presence of joint cavity ✓ **Predicted answer**
- B. Slight mobility
- C. Absence of synovial fluid
- D. Presence of cartilage

Why this answer? correct: cartilaginous joints have NO joint cavity (that belongs to synovial joints), so this is not a feature of them.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q26 (VERIFIED) — Presence of joint cavity.

Question 6 Biology

Water maintains the shape and structure of large biological molecules mainly through:

- A. Ionic interactions

- ulfide bridges
- C. Covalent bonding
- D. Hydrogen bonding and hydrophobic interactions ✓ **Predicted answer**

Why this answer? correct: water maintains the shape and structure of large biological molecules mainly through hydrogen bonding and hydrophobic interactions.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q71 (VERIFIED) — Hydrogen bonding and hydrophobic interactions.

Question 7 Biology

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

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

Why this answer? The keyed answer: Mg^{2+} sits at the centre of the chlorophyll porphyrin ring, and the pigment's excited electrons are associated with that Mg-centred complex. Flagged: strictly, it is the chlorophyll molecule's π-electrons that are excited, not magnesium's own electrons, so the wording is loose and the answer rests on the textbook convention.

Why predicted [B] — Verified fact, predicted to recur: 37m Q38 (VERIFIED) — Magnesium.

Question 8 Biology

Which of the following is biopolymer?

- A. Histone ✓ **Predicted answer**
- B. Waxes
- C. Water

Why this answer? correct: histone is a protein (a polymer of amino acids), so it is a biopolymer.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q73 (VERIFIED) — Histone.

Question 9 Biology

Warming up of the air in nasal cavity occurs with the help of blood capillaries, located _____:

- A. Surrounding the cilia
- B. Surrounding cartilages
- C. In the nasopharynx
- D. Underneath mucous membrane ✓ **Predicted answer**

Why this answer? correct: the air is warmed by the rich network of blood capillaries underneath the mucous membrane of the nasal cavity.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q44 (VERIFIED) — Underneath mucous membrane.

Question 10 Biology

Brain stem include all of the following, Except.

- A. Pons
- B. Midbrain
- C. Medulla Oblongata
- D. Cerebrum ✓ **Predicted answer**

Why this answer? correct: the cerebrum is part of the forebrain, not the brain stem; the brain stem is midbrain, pons and medulla.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q5 (VERIFIED) —

Question 11 Biology

A sudden rise in estrogen levels in females, may leads to which event?

- A. LH surge ✓ **Predicted answer**
- B. Implantation
- C. Progesterone drop
- D. Menstruation

Why this answer? correct: a sudden rise in estrogen triggers the LH surge (positive feedback) that causes ovulation.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q18 (VERIFIED) — LH surge.

Question 12 Biology

In a Mendelian dihybrid cross, what is the phenotypic ratio in the F2 generation?

- A. 9:3:3:1 ✓ **Predicted answer**
- B. 1:2:1
- C. 1:1:1:1
- D. 3:1

Why this answer? Independent assortment of two gene pairs gives the classic F2 dihybrid phenotypic ratio 9:3:3:1 (3:1 is the monohybrid ratio; 1:1:1:1 is the dihybrid test-cross ratio).

Why predicted [C] — Syllabus anchor: syllabus anchor — dihybrid/Mendel recur (37ada Q27: RR × rr F1 genotype; 37ada Q30: genotypes for round yellow peas). Standard textbook fact.

13 Biology

Which organelle is known as the powerhouse of the cell because it generates most of the cell's ATP?

- A. Ribosome
- B. Lysosome
- C. Nucleus
- D. Mitochondria ✓ **Predicted answer**

Why this answer? Mitochondria carry out aerobic respiration and produce most of the cell's ATP; the nucleus stores genetic information and ribosomes make proteins.

Why predicted [C] — Syllabus anchor: syllabus anchor — mitochondria/ATP recur (37ada Q78: organelle producing ATP). Standard textbook fact.

Question 14 Biology

Each granum consists of how many thylakoids?

- A. 50-100
- B. 100-200
- C. 5-10
- D. 25-50 ✓ **Predicted answer**

Why this answer? Each granum is a stack of about 25–50 thylakoids.

Why predicted [B] — Verified fact, predicted to recur: 37m Q1 (VERIFIED) — 25-50.

Question 15 Biology

The terminal ends of chromosomes are called:

- A. Chromatids
- B. Kinetochores
- C. Centromeres

Why this answer? Telomeres cap and protect the ends of chromosomes.

Why predicted [B] — Verified fact, predicted to recur: 37m Q2 (VERIFIED) — Telomeres.

Question 16 Biology

The structure that disappears during cell division is the:

- A. Ribosome
- B. Centriole
- C. Nucleus
- D. Nucleolus ✓ **Predicted answer**

Why this answer? The nucleolus disappears during prophase and reappears in telophase.

Why predicted [B] — Verified fact, predicted to recur: 37m Q4 (VERIFIED) — Nucleolus.

Question 17 Biology

Intracellular digestion of food is done by which organelle?

- A. Golgi complex
- B. Ribosome
- C. Mitochondrion
- D. Lysosome ✓ **Predicted answer**

Why this answer? Lysosomes contain digestive enzymes that break down material inside the cell.

Why predicted [B] — Verified fact, predicted to recur: 37m Q6 (VERIFIED) — Lysosome.

Question 18 Biology

Which axon would transmit an action potential most rapidly?

- B. 2 mm diameter neuron without myelin
- C. 1 mm diameter neuron without myelin
- D. 2 mm diameter neuron with myelin ✓ **Predicted answer**

Why this answer? Myelin and a larger diameter both speed up impulse conduction.

Why predicted [B] — Verified fact, predicted to recur: 37m Q7 (VERIFIED) — 2mm diameter neuron with myelin.

Question 19 Biology

Vasopressin is an example of a:

- A. Amino acid derivative
- B. Fatty acid hormone
- C. Steroid hormone
- D. Peptide hormone ✓ **Predicted answer**

Why this answer? Vasopressin (ADH) is a peptide hormone made of nine amino acids.

Why predicted [B] — Verified fact, predicted to recur: 37m Q8 (VERIFIED) — Peptide hormone.

Question 20 Biology

Which function is NOT controlled by the hypothalamus?

- A. Body temperature
- B. Hunger
- C. Storing long-time memories ✓ **Predicted answer**
- D. Thirst

Why this answer? The hypothalamus controls temperature, hunger and thirst, but long-term memory storage is a cerebral function.

ed [B] — Verified fact, predicted to recur: 37m Q9 (VERIFIED) — Storing long time memories.

Question 21 Biology

Which hormone is produced by the posterior lobe of the pituitary gland and induces labour pains?

- A. Oxytocin ✓ **Predicted answer**
- B. Prolactin
- C. ADH
- D. Growth hormone

Why this answer? Oxytocin is released from the posterior pituitary and causes uterine contractions in labour.

Why predicted [A] — Repeated question: repeated — 37m Q10 and 37ahq Q79 all key Oxytocin. Also asked as: 37m Q10: “Posterior lobe of pituitary gland produces:”; 37ahq Q79: “Which hormone is produced by the posterior pituitary gland?”

Question 22 Biology

In neurons, the message is transmitted across the synapse in the form of a chemical messenger called a:

- A. Enzyme
- B. Receptor
- C. Hormone
- D. Neurotransmitter ✓ **Predicted answer**

Why this answer? Neurotransmitters carry the signal across the synaptic gap.

Why predicted [B] — Verified fact, predicted to recur: 37m Q11 (VERIFIED) — Neurotransmitter.

23 Biology

The microscopic gap between two neurons is called a:

- A. Synapse ✓ **Predicted answer**
- B. Synapsis
- C. Synaptic knob
- D. Axon hillock

Why this answer? The synapse is the junction across which one neuron signals the next.

Why predicted [A] — Repeated question: repeated — 37m Q12 and 37ahq Q77 all key Synapse. Also asked as: 37m Q12: “Microscopic gap between the two neurons is called:”; 37ahq Q77: “The microscopic gap between two neurons is called:”

Question 24 Biology

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

- A. Spinal cord
- B. Brain
- C. Ventral root ganglion
- D. Dorsal root ganglion ✓ **Predicted answer**

Why this answer? The sensory neuron's cell body sits in the dorsal root ganglion.

Why predicted [B] — Verified fact, predicted to recur: 37m Q13 (VERIFIED) — Dorsal root ganglion.

Question 25 Biology

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

- A. Cerebellum
- B. Medulla
- C. Hypothalamus

ygdalae ✓ **Predicted answer**

Why this answer? The amygdalae (limbic system) process emotions such as love, hate and fear.

Why predicted [B] — Verified fact, predicted to recur: 37m Q14 (VERIFIED) — Amygdalae.

Question 26 Biology

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

- A. Allosteric site
- B. Substrate
- C. Cofactor
- D. Active site ✓ **Predicted answer**

Why this answer? Only the active site binds the substrate and catalyses the reaction.

Why predicted [B] — Verified fact, predicted to recur: 37m Q17 (VERIFIED) — Active site.

Question 27 Biology

The maximum enzymatic activity of trypsin is shown at pH:

- A. 2
- B. 5
- C. 8 ✓ **Predicted answer**
- D. 11

Why this answer? Trypsin, a pancreatic enzyme, works best in the alkaline medium of the small intestine, around pH 8.

Why predicted [B] — Verified fact, predicted to recur: 37m Q18 (VERIFIED) — pH 8.

28 Biology

Most enzymes have an optimum temperature of around:

- A. 60 °C
- B. 80 °C
- C. 20 °C
- D. 40 °C ✓ **Predicted answer**

Why this answer? Most human enzymes work best near body temperature, around 37–40 °C.

Why predicted [B] — Verified fact, predicted to recur: 37m Q19 (VERIFIED) — 40 O C.

Question 29 Biology

A competitive inhibitor reduces enzyme activity by:

- A. Denaturing the enzyme
- B. Destroying the substrate
- C. Binding to the allosteric site
- D. Blocking the substrate from entering the active site due to similar shape ✓ **Predicted answer**

Why this answer? Competitive inhibitors resemble the substrate and compete for the active site.

Why predicted [B] — Verified fact, predicted to recur: 37m Q22 (VERIFIED) — Competitive inhibitors.

Question 30 Biology

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

- A. Lamarck
- B. Mendel

- D. Wallace

Why this answer? Charles Darwin proposed evolution by natural selection in On the Origin of Species.

Why predicted [B] — Verified fact, predicted to recur: 37m Q23 (VERIFIED) — Darwin.

Question 31 Biology

Among the oldest known fossils are those of the:

- A. Fish
- B. Flowering plants
- C. Dinosaurs
- D. Prokaryotes ✓ **Predicted answer**

Why this answer? The oldest fossils are of prokaryotic bacteria, about 3.5 billion years old.

Why predicted [B] — Verified fact, predicted to recur: 37m Q24 (VERIFIED) — Prokaryotes.

Question 32 Biology

What is the contribution of the hormone cholecystokinin?

- A. Increases stomach acid
- B. Slows heart rate
- C. Stimulates insulin release
- D. Facilitates bile release from the gall bladder ✓ **Predicted answer**

Why this answer? Cholecystokinin triggers the gall bladder to release bile into the duodenum.

Why predicted [B] — Verified fact, predicted to recur: 37m Q25 (VERIFIED) — Facilitates

Question 33 Biology

Which of the following is NOT a component of bile?

- A. Bile salts
- B. Bile pigments
- C. Digestive enzymes ✓ **Predicted answer**
- D. Water

Why this answer? Bile contains bile salts and pigments but no digestive enzymes.

Why predicted [B] — Verified fact, predicted to recur: 37m Q26 (VERIFIED) — Digestive enzymes.

Question 34 Biology

The first chemical digestion of proteins takes place in the:

- A. Duodenum
- B. Ileum
- C. Mouth
- D. Stomach ✓ **Predicted answer**

Why this answer? Pepsin in the stomach begins the chemical digestion of proteins.

Why predicted [B] — Verified fact, predicted to recur: 37m Q27 (VERIFIED) — Stomach.

Question 35 Biology

Select the duration of the cardiac cycle:

- A. 1.2 sec
- B. 1.6 sec
- C. 0.4 sec

sec ✓ **Predicted answer**

Why this answer? One heartbeat (cardiac cycle) lasts about 0.8 seconds at rest.

Why predicted [B] — Verified fact, predicted to recur: 37m Q28 (VERIFIED) — 0.8 sec.

Question 36 Biology

Which hormone increases the activity of the parietal and chief cells of the stomach?

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

Why this answer? Gastrin stimulates the parietal cells (acid) and chief cells (pepsinogen) of the stomach.

Why predicted [B] — Verified fact, predicted to recur: 37m Q29 (VERIFIED) — Gastrin.

Question 37 Biology

The enzyme trypsinogen is activated by:

- A. Lipase
- B. Amylase
- C. Pepsin
- D. Enterokinase ✓ **Predicted answer**

Why this answer? Enterokinase in the duodenum converts trypsinogen to active trypsin.

Why predicted [B] — Verified fact, predicted to recur: 37m Q31 (VERIFIED) — Enterokinase.

38 Biology

Emulsification of large fat globules is facilitated by:

- A. Hydrochloric acid
- B. Mucus
- C. Lipase
- D. Bile salts ✓ **Predicted answer**

Why this answer? Bile salts break large fat globules into small droplets for lipase to act on.

Why predicted [B] — Verified fact, predicted to recur: 37m Q32 (VERIFIED) — Bile salts.

Question 39 Biology

The area between the two lungs is called the:

- A. Pericardium
- B. Diaphragm
- C. Pleura
- D. Mediastinum ✓ **Predicted answer**

Why this answer? The mediastinum is the space between the lungs that holds the heart and great vessels.

Why predicted [B] — Verified fact, predicted to recur: 37m Q33 (VERIFIED) — Mediastinum.

Question 40 Biology

The unique macromolecule in the bacterial cell wall is:

- A. Chitin
- B. Cellulose
- C. Peptidoglycan ✓ **Predicted answer**

Why this answer? Peptidoglycan (murein) is the unique polymer of bacterial cell walls.

Why predicted [A] — Repeated question: repeated — 37m Q54 and 37ahq Q70 all key Peptidoglycan. Also asked as: 37m Q54: “The unique macro-molecule in the bacterial cell wall is:”; 37ahq Q70: “The unique macromolecule in the bacterial cell wall is:”

Question 41 Biology

The basic structural and functional unit of life is the:

- A. Tissue
- B. Organ
- C. Cell ✓ **Predicted answer**
- D. Organelle

Why this answer? The cell is the smallest unit that carries out all life processes.

Why predicted [C] — Syllabus anchor: syllabus anchor — cell structure recurs (37m Q3: Golgi complex in secretory cells; 37m Q6: lysosome and intracellular digestion). Standard textbook fact.

Question 42 Biology

Which gas is released by plants during photosynthesis?

- A. Carbon dioxide
- B. Nitrogen
- C. Oxygen ✓ **Predicted answer**
- D. Hydrogen

Why this answer? Plants release oxygen as a by-product when they split water in the light reactions.

Why predicted [C] — Syllabus anchor: syllabus anchor — photosynthesis recurs (37m

dependent phase forms energy-rich carbohydrates; 37m Q38: magnesium is excited in the light reaction). Standard textbook fact.

Question 43 Biology

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

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

Why this answer? Secretory cells need extensive Golgi complexes to modify, package and export their products.

Why predicted [A] — Repeated question: repeated — 37m Q3 and 37ada Q80 all key Golgi complex. Also asked as: 37m Q3: “Which organelles would be more abundant in a secretory cell than non-secretory cells?”; 37ada Q80: “Which organelle is abundant in secretory cells?”

Question 44 Biology

The enzyme ATP synthase is located on the membrane of the:

- A. Nucleus
- B. Ribosome
- C. Mitochondria ✓ **Predicted answer**
- D. Golgi complex

Why this answer? ATP synthase sits on the inner mitochondrial membrane, where it makes ATP.

Why predicted [A] — Repeated question: repeated — 37m Q5 and 37ada Q78 all key Mitochondria. Also asked as: 37m Q5: “The enzyme ATP synthase is located on the

Question 45 Biology

The pathway of water transport in which water moves through plasmodesmata is the:

- A. Symplast ✓ **Predicted answer**
- B. Transpiration stream
- C. Guttation
- D. Apoplast

Why this answer? In the symplast pathway water moves cell to cell through plasmodesmata.

Why predicted [A] — Repeated question: repeated — 37m Q30 and 37ahq Q68 all key Symplast. Also asked as: 37m Q30: “The pathways of water transport in which water moves through plasmodesmata is:”; 37ahq Q68: “Water moves through plasmodesmata in the pathway called:”

Question 46 Biology

All viruses are:

- A. Autotrophs
- B. Decomposers
- C. Saprophytes
- D. Parasites ✓ **Predicted answer**

Why this answer? Viruses are obligate parasites: they can only reproduce inside a living host cell.

Why predicted [B] — Verified fact, predicted to recur: 37m Q35 (VERIFIED) — Parasites.

47 Biology

The light-independent phase of photosynthesis involves the:

- A. Formation of energy-rich carbohydrates ✓ **Predicted answer**
- B. Release of oxygen
- C. Excitation of chlorophyll
- D. Splitting of water

Why this answer? The dark reactions use ATP and NADPH to build carbohydrates from carbon dioxide.

Why predicted [B] — Verified fact, predicted to recur: 37m Q37 (VERIFIED) — Formation of energy rich carbohydrates.

Question 48 Biology

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

- A. Manganese
- B. Copper
- C. Iron
- D. Magnesium ✓ **Predicted answer**

Why this answer? Magnesium sits at the centre of the chlorophyll molecule, and its electrons are excited by light.

Why predicted [B] — Verified fact, predicted to recur: 37m Q38 (VERIFIED) — Magnesium.

Question 49 Biology

Which function is NOT performed by proteins?

- A. Catalysing reactions
- B. Transporting substances

viding insulation against heat loss ✓ **Predicted answer**

- D. Defending the body

Why this answer? Insulation is provided by fats, not proteins; proteins catalyse, transport and defend.

Why predicted [B] — Verified fact, predicted to recur: 37m Q40 (VERIFIED) — Providing insulation against heat loss.

Question 50 Biology

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

- A. C-C
- B. C-O
- C. C-H ✓ **Predicted answer**
- D. O-H

Why this answer? The C–H bond stores the chemical energy that cells release by oxidation.

Why predicted [B] — Verified fact, predicted to recur: 37m Q42 (VERIFIED) — C-H.

Question 51 Biology

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

- A. High specific heat capacity ✓ **Predicted answer**
- B. Low boiling point
- C. Surface tension
- D. Low density

Why this answer? Water's high specific heat capacity lets it absorb and release large amounts of heat with little temperature change.

Why predicted [B] — Verified fact, predicted to recur: 37m Q43 (VERIFIED) — High

capacity.

Question 52 Biology

Which of the following carbohydrates are the sweetest of all?

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

Why this answer? Monosaccharides (such as fructose) are the sweetest carbohydrates.

Why predicted [B] — Verified fact, predicted to recur: 37m Q45 (VERIFIED) — Monosaccharides.

Question 53 Biology

Which organelles of animal cells are called suicidal bags?

- A. Ribosomes
- B. Vacuoles
- C. Mitochondria
- D. Lysosomes ✓ **Predicted answer**

Why this answer? Lysosomes are called suicidal bags because their enzymes can digest the cell itself if released.

Why predicted [B] — Verified fact, predicted to recur: 37m Q46 (VERIFIED) — Lysosomes.

Question 54 Biology

Chemically, the cell wall of fungi is made up of:

- A. Cellulose

tidoglycan

- C. Chitin ✓ **Predicted answer**
- D. Lignin

Why this answer? Fungal cell walls are made of chitin, the same polymer as insect exoskeletons.

Why predicted [B] — Verified fact, predicted to recur: 37m Q47 (VERIFIED) — Chitin.

Question 55 Biology

The organelle that provides neurotransmitters in the nervous pathway is the:

- A. Golgi apparatus ✓ **Predicted answer**
- B. Endoplasmic reticulum
- C. Nucleus
- D. Mitochondrion

Why this answer? The Golgi apparatus packages neurotransmitters into vesicles for release at synapses.

Why predicted [B] — Verified fact, predicted to recur: 37m Q48 (VERIFIED) — Golgi apparatus.

Question 56 Biology

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

- A. Thylakoids
- B. Cisternae
- C. Grana
- D. Cristae ✓ **Predicted answer**

Why this answer? Cristae are the folds of the inner mitochondrial membrane that increase its surface area.

ed [B] — Verified fact, predicted to recur: 37m Q49 (VERIFIED) — Cristae.

Question 57 Biology

Adenylate cyclase, in the cell membrane, acts as an:

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

Why this answer? Adenylate cyclase is the membrane enzyme that converts ATP to cyclic AMP.

Why predicted [B] — Verified fact, predicted to recur: 37m Q50 (VERIFIED) — Enzyme.

Question 58 Biology

Vaccination is an example of:

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

Why this answer? Vaccination deliberately exposes the body to antigen, producing active immunity.

Why predicted [B] — Verified fact, predicted to recur: 37m Q52 (VERIFIED) — Acquired/Artificial active immunity.

Question 59 Biology

The lymphatic system contains all of the following organs/structures EXCEPT the:

- A. Spleen

- C. Lungs ✓ **Predicted answer**
- D. Thymus

Why this answer? The lungs are respiratory organs, not part of the lymphatic system.

Why predicted [B] — Verified fact, predicted to recur: 37m Q53 (VERIFIED) — Lungs.

Question 60 Biology

Transfer of genetic material from one bacterium to another through a third party, usually a bacteriophage, is called:

- A. Transformation
- B. Conjugation
- C. Transduction ✓ **Predicted answer**
- D. Translation

Why this answer? In transduction a bacteriophage carries bacterial DNA from one cell to another.

Why predicted [B] — Verified fact, predicted to recur: 37m Q55 (VERIFIED) — Transduction.

Question 61 Biology

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

- A. Heat
- B. Filtration
- C. Radiation
- D. Antiseptics ✓ **Predicted answer**

Why this answer? Antiseptics are chemical agents; heat, filtration and radiation are physical methods.

ed [B] — Verified fact, predicted to recur: 37m Q56 (VERIFIED) — Antiseptics.

Question 62 Biology

Which of the following helps in developing immunity against germs?

- A. Vaccines ✓ **Predicted answer**
- B. Antiseptics
- C. Disinfectants
- D. Antibiotics

Why this answer? Vaccines train the immune system to recognise and fight specific germs.

Why predicted [B] — Verified fact, predicted to recur: 37m Q57 (VERIFIED) — Vaccines.

Question 63 Biology

After fertilisation, the zygote takes how long for its journey from the fallopian tube to the uterus?

- A. 7-10 days
- B. 10-14 days
- C. 1-2 days
- D. 3-6 days ✓ **Predicted answer**

Why this answer? The zygote travels down the fallopian tube and reaches the uterus in about 3–6 days.

Why predicted [B] — Verified fact, predicted to recur: 37m Q58 (VERIFIED) — 3-6 days.

Question 64 Biology

The best temperature for spermatogenesis is:

C ✓ **Predicted answer**

- B. 39 °C
- C. 33 °C
- D. 37 °C

Why this answer? Spermatogenesis works best slightly below body temperature, around 35 °C in the scrotum.

Why predicted [B] — Verified fact, predicted to recur: 37m Q59 (VERIFIED) — 35 O C.

Question 65 Biology

In human females, FSH stimulates:

- A. Milk production
- B. Menstruation
- C. Ovulation
- D. Follicle development ✓ **Predicted answer**

Why this answer? Follicle-stimulating hormone drives the growth of ovarian follicles.

Why predicted [B] — Verified fact, predicted to recur: 37m Q60 (VERIFIED) — Follicle development.

Question 66 Biology

Leydig cells in the testes are responsible for:

- A. Testosterone production ✓ **Predicted answer**
- B. Nourishing sperm
- C. Producing semen
- D. Sperm production

Why this answer? The Leydig (interstitial) cells secrete testosterone.

Why predicted [B] — Verified fact, predicted to recur: 37m Q61 (VERIFIED) —

Question 67 Biology

Which of the following is the site of protein synthesis in the cell?

- A. Golgi apparatus
- B. Lysosome
- C. Nucleus
- D. Ribosome ✓ **Predicted answer**

Why this answer? Ribosomes translate mRNA into protein.

Why predicted [C] — Syllabus anchor: syllabus anchor — cell organelles recur (37m Q3: Golgi complex in secretory cells; 37m Q6: lysosome and intracellular digestion). Standard textbook fact.

Question 68 Biology

The exchange of gases in humans takes place in the:

- A. Bronchi
- B. Trachea
- C. Alveoli ✓ **Predicted answer**
- D. Larynx

Why this answer? Gas exchange occurs across the thin walls of the alveoli in the lungs.

Why predicted [C] — Syllabus anchor: syllabus anchor — respiration recurs (37m Q33: the mediastinum is the area between the two lungs). Standard textbook fact.

Question 69 Biology

_____ is the inflammation of joints:

- A. Osteoarthritis ✓ **Predicted answer**

- C. Rickets
- D. Scurvy

Why this answer? Osteoarthritis is the inflammatory/degenerative disease of the joints.

Why predicted [B] — Verified fact, predicted to recur: 37m Q63 (VERIFIED) — Osteoarthritis.

Question 70 Biology

Tetany is caused by low levels of which ion in the blood?

- A. Low Na+
- B. Low K+
- C. Low Ca++ ✓ **Predicted answer**
- D. Low Mg++

Why this answer? Tetany (painful muscle spasms) is caused by low blood calcium.

Why predicted [B] — Verified fact, predicted to recur: 37m Q64 (VERIFIED) — Low Ca++.

Question 71 Biology

What is the function of myoglobin?

- A. Store oxygen ✓ **Predicted answer**
- B. Carry carbon dioxide
- C. Produce ATP
- D. Transport oxygen in blood

Why this answer? Myoglobin stores oxygen in muscle cells for use during exercise.

Why predicted [B] — Verified fact, predicted to recur: 37m Q65 (VERIFIED) — Store oxygen.

72 Biology

A joint in which the ends of bones are covered with hyaline cartilage and held together by a surrounding tube-like capsule is a:

- A. Fibrous joint
- B. Cartilaginous joint
- C. Synovial joint ✓ **Predicted answer**
- D. Fixed joint

Why this answer? Synovial joints have hyaline cartilage on the bone ends and a fluid-filled capsule.

Why predicted [B] — Verified fact, predicted to recur: 37m Q66 (VERIFIED) — Synovial Joint.

Question 73 Biology

Genes that tend to be inherited together and do not assort independently are called:

- A. Recessive genes
- B. Codominant genes
- C. Alleles
- D. Linked genes ✓ **Predicted answer**

Why this answer? Genes on the same chromosome are linked and are inherited together.

Why predicted [B] — Verified fact, predicted to recur: 37m Q67 (VERIFIED) — Linked genes.

Question 74 Biology

Mendelian inheritance follows which form of dominance relation?

- A. Incomplete dominance
- B. Codominance

- D. Overdominance

Why this answer? Mendel's crosses show complete dominance of one allele over the other.

Why predicted [B] — Verified fact, predicted to recur: 37m Q68 (VERIFIED) — Complete dominance.

Question 75 Biology

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

- A. HIV ✓ **Predicted answer**
- B. Hepatitis A
- C. Malaria
- D. Tuberculosis

Why this answer? HIV spreads through infected blood and shared syringes.

Why predicted [A] — Repeated question: repeated — 37m Q36 and 37ahq Q108 all key HIV. Also asked as: 37m Q36: “Which of the following is transmitted through infected blood and hypothermal syringes?”; 37ahq Q108: “_____ is transmitted through infected blood and hypodermic syringes:”

Question 76 Biology

A non-protein but inorganic detachable cofactor is called an:

- A. Activator ✓ **Predicted answer**
- B. Prosthetic group
- C. Coenzyme
- D. Apoenzyme

Why this answer? Inorganic ions that activate enzymes are called activators.

ed [B] — Verified fact, predicted to recur: 37ahq Q55 (VERIFIED) — Activator.

Question 77 Biology

The Lock and Key model for enzyme action, proposed by Emil Fischer, suggests that:

- A. Enzymes work at any temperature
- B. Enzymes are used up in reactions
- C. Enzymes change shape for every substrate
- D. Enzymes are restricted to one reaction type ✓ **Predicted answer**

Why this answer? In the lock-and-key model each enzyme fits only its specific substrate, so it catalyses one reaction type.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q56 (VERIFIED) — Enzymes are restricted to one reaction type.

Question 78 Biology

A general formula for calculating the frequencies of alleles and genotypes in a population was derived by:

- A. Mendel
- B. Darwin
- C. Hardy-Weinberg ✓ **Predicted answer**
- D. Lamarck

Why this answer? The Hardy-Weinberg principle gives the allele and genotype frequencies in a population.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q60 (VERIFIED) — Hardy Weinberg.

79 Biology

When humans purposefully apply selection pressure to populations, the process is known as:

- A. Artificial selection ✓ **Predicted answer**
- B. Genetic drift
- C. Mutation
- D. Natural selection

Why this answer? Humans selecting desired traits in plants and animals is artificial selection.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q61 (VERIFIED) — Artificial selection.

Question 80 Biology

Regarding the structure of the human heart, chordae tendineae are present in the:

- A. Aorta
- B. Pericardium
- C. Atria
- D. Ventricles ✓ **Predicted answer**

Why this answer? Chordae tendineae anchor the atrioventricular valves inside the ventricles.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q66 (VERIFIED) — Ventricles.

Question 81 Biology

In which phase of bacterial growth do bacteria divide at an exponential rate?

- A. Log phase ✓ **Predicted answer**

- C. Death phase
- D. Lag phase

Why this answer? In the log (exponential) phase bacteria divide at their maximum rate.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q69 (VERIFIED) — Log phase.

Question 82 Biology

The function of the pilus in bacteria is to:

- A. Attach to surfaces only
- B. Produce spores
- C. Move the cell
- D. Exchange genetic material ✓ **Predicted answer**

Why this answer? The pilus (sex pilus) transfers DNA between bacterial cells during conjugation.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q71 (VERIFIED) — Exchange genetic material.

Question 83 Biology

The membrane separating the vacuole from the cytoplasm is called the:

- A. Tonoplast ✓ **Predicted answer**
- B. Nuclear membrane
- C. Cell wall
- D. Plasma membrane

Why this answer? The tonoplast is the membrane around the vacuole.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q75 (VERIFIED) —

Question 84 Biology

GABA is an example of an:

- A. Hormone
- B. Enzyme
- C. Excitatory neurotransmitter
- D. Inhibitory neurotransmitter ✓ **Predicted answer**

Why this answer? GABA is the main inhibitory neurotransmitter of the brain.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q81 (VERIFIED) — Inhibitory neurotransmitter.

Question 85 Biology

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

- A. Triglyceride ✓ **Predicted answer**
- B. Steroid
- C. Wax
- D. Phospholipid

Why this answer? A triglyceride is glycerol joined to three fatty acid tails.

Why predicted [A] — Repeated question: repeated — 37m Q41 and 37ahq Q116 all key Triglyceride. Also asked as: 37m Q41: “Three hydrophobic fatty acid tails and a glycerol molecule join to form a:”; 37ahq Q116: “Three hydrophobic fatty acid tails and a glycerol molecule join to form a:”

Question 86 Biology

Follicle-stimulating hormone (FSH) is secreted by the:

- B. Ovary
- C. Thyroid gland
- D. Pituitary gland ✓ **Predicted answer**

Why this answer? FSH is secreted by the anterior pituitary gland.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q91 (VERIFIED) — Pituitary gland.

Question 87 Biology

In human males, the inhibin hormone is produced by the:

- A. Sertoli cells ✓ **Predicted answer**
- B. Germ cells
- C. Prostate gland
- D. Leydig cells

Why this answer? Sertoli cells in the testes produce inhibin, which regulates FSH.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q93 (VERIFIED) — Sertoli cells.

Question 88 Biology

A condition in which a joint becomes swollen, painful and immovable is called:

- A. Tetany
- B. Rickets
- C. Osteoarthritis
- D. Arthritis ✓ **Predicted answer**

Why this answer? Arthritis is the inflammation of a joint with swelling, pain and stiffness.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q96 (VERIFIED) — Arthritis.

89 Biology

Mature bone cells are called:

- A. Osteocytes ✓ **Predicted answer**
- B. Osteoblasts
- C. Fibroblasts
- D. Chondrocytes

Why this answer? Osteocytes are the mature bone cells embedded in the bone matrix.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q98 (VERIFIED) — Osteocytes.

Question 90 Biology

Which organelle is responsible for photosynthesis in plant cells?

- A. Ribosome
- B. Vacuole
- C. Mitochondrion
- D. Chloroplast ✓ **Predicted answer**

Why this answer? Photosynthesis takes place in the chloroplast, which contains chlorophyll.

Why predicted [C] — Syllabus anchor: syllabus anchor — photosynthesis and chloroplasts recur (37ahq Q110: NADP+ is the final acceptor in the light reactions; 37ahq Q113: the Calvin cycle end product is glyceraldehyde 3-phosphate). Standard textbook fact.

Question 91 Chemistry

Catalytic reduction of Aldehyde & Ketone forms:

- A. Alkane

- C. Alcohol ✓ **Predicted answer**
- D. Carboxylic acid

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

Why predicted [B] — Verified fact, predicted to recur: 37m Q177 (VERIFIED) — Alcohol.

Question 92 Chemistry

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

- A. Catalyst ✓ **Predicted answer**
- B. Temperature
- C. Pressure
- D. Concentration

Why this answer? Speeds forward and reverse reactions equally, reaching the SAME equilibrium sooner; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m Q131 (VERIFIED) — Catalyst.

Question 93 Chemistry

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

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

Why this answer? Homocyclic (all-carbon rings) divide into alicyclic (saturated/unsaturated non-aromatic rings) and aromatic rings; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m Q151 (VERIFIED) — Alicyclic

Question 94 Chemistry

If the temperature of a gas is doubled at constant pressure, what will be its volume:

- A. Remains constant
- B. Quadrupled
- C. Halved
- D. Doubled ✓ **Predicted answer**

Why this answer? correct: by Charles's law (V ∝ T at constant pressure), doubling the absolute temperature doubles the volume.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q82 (VERIFIED) — Doubled.

Question 95 Chemistry

What is incorrect about activated complex?

- A. Potentia energy is maximum at activated complex stage
- B. It is a high energy specie
- C. It is a stable specie ✓ **Predicted answer**
- D. It is an unstable specie

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

Why predicted [B] — Verified fact, predicted to recur: 37m Q133 (VERIFIED) — It is a stable specie.

Question 96 Chemistry

Calculate the number of molecules in 244g of Benzoic acid? ($C_7H_6O_2$)

- $\times 10^{}$ ✓ **Predicted answer**
- B. 0.12×10^{31}
- C. 12×10^{24}
- D. 12×10^{23}

Why this answer? correct: benzoic acid ($C_7H_6O_2$) has molar mass 122 g/mol, so 244 g = 2 mol = $2 \times 6.02 \times 10^{23} = 1.2 \times 10^{24}$ molecules.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q119 (VERIFIED) — 1.2×10^{24}.

Question 97 Chemistry

Which element has the highest electronegativity in the periodic table?

- A. Nitrogen
- B. Chlorine
- C. Oxygen
- D. Fluorine ✓ **Predicted answer**

Why this answer? Fluorine is the most electronegative element (about 4.0 on the Pauling scale); electronegativity increases across a period and decreases down a group.

Why predicted [C] — Syllabus anchor: syllabus anchor — electronegativity/periodic trends recur (37ada Q96: lowest electronegativity). Standard textbook fact.

Question 98 Chemistry

The molecules of iodine (I2) form:

- A. Ionic crystals
- B. Covalent crystals
- C. Molecular crystals ✓ **Predicted answer**
- D. Metallic crystals

swer? Iodine molecules are held together by weak van der Waals forces, forming molecular crystals.

Why predicted [B] — Verified fact, predicted to recur: 37m Q127 (VERIFIED) — Molecular crystals.

Question 99 Chemistry

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

- A. H-bonding ✓ **Predicted answer**
- B. Ionic bonding
- C. Metallic bonding
- D. Covalent bonding

Why this answer? Pressure melts a thin layer at the contact, and hydrogen bonding re-freezes the cubes together (regelation).

Why predicted [B] — Verified fact, predicted to recur: 37m Q128 (VERIFIED) — H - bonding.

Question 100 Chemistry

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

- A. Lower temperature
- B. Catalyst activation
- C. Faster reaction
- D. Better yield ✓ **Predicted answer**

Why this answer? High pressure shifts the equilibrium towards ammonia, improving the yield.

Why predicted [B] — Verified fact, predicted to recur: 37m Q130 (VERIFIED) — Better yield.

101 Chemistry

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

- A. Catalyst ✓ **Predicted answer**
- B. Higher temperature
- C. Higher pressure
- D. Larger volume

Why this answer? A catalyst speeds up both forward and reverse reactions, so equilibrium is reached sooner (without changing its position).

Why predicted [B] — Verified fact, predicted to recur: 37m Q131 (VERIFIED) — Catalyst.

Question 102 Chemistry

Which of the following is NOT a use of a buffer solution?

- A. Maintaining pH
- B. Resisting pH change
- C. Predicting the concentration of a substance ✓ **Predicted answer**
- D. Controlling pH in blood

Why this answer? Buffers maintain and resist pH change; they do not predict concentrations.

Why predicted [B] — Verified fact, predicted to recur: 37m Q132 (VERIFIED) — Predict the concentration of a substance.

Question 103 Chemistry

What is incorrect about the activated complex?

- A. It is a stable species ✓ **Predicted answer**
- B. It has partial bonds
- C. It has high energy

formed at the peak of the energy profile

Why this answer? The activated complex is a transient, unstable, high-energy arrangement, not a stable species.

Why predicted [B] — Verified fact, predicted to recur: 37m Q133 (VERIFIED) — It is a stable specie.

Question 104 Chemistry

The unit of the rate constant is the same as the unit of the rate of reaction for which order of reaction?

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

Why this answer? For a zero-order reaction the rate constant has the same units as the rate ($mol \cdot dm^{-3} \cdot s^{-1}$).

Why predicted [B] — Verified fact, predicted to recur: 37m Q134 (VERIFIED) — Zero.

Question 105 Chemistry

The correct equation for the first law of thermodynamics is:

- A. $\Delta H = \Delta E + P\Delta V$
- B. $\Delta G = \Delta H - T\Delta S$
- C. $\Delta E = q - w$
- D. $\Delta E = q + w$ ✓ **Predicted answer**

Why this answer? The first law states that the change in internal energy equals heat added plus work done on the system.

Why predicted [B] — Verified fact, predicted to recur: 37m Q136 (VERIFIED) — $\Delta E = q +$

Question 106 Chemistry

One calorie is equal to:

- A. 4.18 J ✓ **Predicted answer**
- B. 1.0 J
- C. 9.81 J
- D. 1000 J

Why this answer? One calorie (the heat to raise 1 g of water by 1 °C) equals 4.18 joules.

Why predicted [B] — Verified fact, predicted to recur: 37m Q137 (VERIFIED) — 4.18 J.

Question 107 Chemistry

The thermal energy at constant pressure is called:

- A. Enthalpy ✓ **Predicted answer**
- B. Entropy
- C. Free energy
- D. Internal energy

Why this answer? Enthalpy (H) is the heat content of a system at constant pressure.

Why predicted [B] — Verified fact, predicted to recur: 37m Q138 (VERIFIED) — Enthalpy.

Question 108 Chemistry

Which statement correctly describes the standard electrode potential?

- A. It is always zero
- B. It is measured at 100 °C
- C. It is measured against a copper electrode
- D. It is the electrode potential determined under standard conditions using the

ard hydrogen electrode as the other electrode ✓ **Predicted answer**

Why this answer? Standard potentials are defined against the standard hydrogen electrode at 298 K, 1 atm and 1 M.

Why predicted [B] — Verified fact, predicted to recur: 37m Q139 (VERIFIED) — It is the electrode potential determined under standard conditions using StandardHydrogen Electrode as the other electrode.

Question 109 Chemistry

The oxidation number of an element in its free state is:

- A. +1
- B. −1
- C. Zero ✓ **Predicted answer**
- D. +2

Why this answer? An element uncombined with any other element has oxidation number zero.

Why predicted [B] — Verified fact, predicted to recur: 37m Q140 (VERIFIED) — Zero.

Question 110 Chemistry

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

- A. Thermochemistry
- B. Electrochemistry ✓ **Predicted answer**
- C. Photochemistry
- D. Biochemistry

Why this answer? Electrochemistry studies cells, electrolysis and the interconversion of electrical and chemical energy.

ed [B] — Verified fact, predicted to recur: 37m Q141 (VERIFIED) — Electrochemistry.

Question 111 Chemistry

Which of the following has the greatest difference in electronegativity?

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

Why this answer? Fluorine is the most electronegative element, so HF has the largest electronegativity difference.

Why predicted [B] — Verified fact, predicted to recur: 37m Q142 (VERIFIED) — HF.

Question 112 Chemistry

Ionisation energy decreases down a group because:

- A. Nuclear charge decreases
- B. Atomic radius increases ✓ **Predicted answer**
- C. Shielding decreases
- D. Electrons are added to the same shell

Why this answer? Down a group the outer electron is farther from the nucleus and more shielded, so it is easier to remove.

Why predicted [B] — Verified fact, predicted to recur: 37m Q143 (VERIFIED) — Atomic radius increases.

Question 113 Chemistry

Carbon atoms in ethane are hybridised as:

- B. sp2
- C. sp3 ✓ **Predicted answer**
- D. sp3d

Why this answer? Each carbon in ethane forms four sigma bonds, so it is sp3 hybridised.

Why predicted [B] — Verified fact, predicted to recur: 37m Q144 (VERIFIED) — Sp3.

Question 114 Chemistry

The type of bonding in zinc is:

- A. Ionic
- B. Covalent
- C. Metallic ✓ **Predicted answer**
- D. Hydrogen

Why this answer? Zinc is a metal, so its atoms are held by metallic bonding.

Why predicted [B] — Verified fact, predicted to recur: 37m Q145 (VERIFIED) — Metallic.

Question 115 Chemistry

Which of the following is a semiconductor?

- A. Copper
- B. Silicon ✓ **Predicted answer**
- C. Iron
- D. Aluminium

Why this answer? Silicon is the classic semiconductor; copper, iron and aluminium are conductors.

Why predicted [B] — Verified fact, predicted to recur: 37m Q146 (VERIFIED) — Si.

116 Chemistry

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

- A. Metamerism
- B. Tautomerism ✓ **Predicted answer**
- C. Position isomerism
- D. Functional group isomerism

Why this answer? Tautomerism is isomerism from the shift of a proton within the same molecule (as in keto-enol tautomerism).

Why predicted [A] — Repeated question: repeated — 37m Q152 and 37ahq Q129 all key Tautomerism. Also asked as: 37m Q152: “The type of isomerism arising due to shifting of proton fron one atom to another in the same molecule is:”; 37ahq Q129: “Isomerism due to shifting of proton from one atom to another in a same molecule is known as:”

Question 117 Chemistry

The correct order of reactivity of hydrocarbons is:

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

Why this answer? Alkenes are the most reactive, then alkynes, then the saturated alkanes.

Why predicted [A] — Repeated question: repeated — 37m Q169 and 37ahq Q135 all key Alkenes > Alkynes > Alkanes. Also asked as: 37m Q169: “The correct order of reactivity of hydrocarbons is:”; 37ahq Q135: “The correct order of reactivity of hydrocarbons is:”

118 Chemistry

Which of the following is the SI unit of energy?

- A. Watt
- B. Joule ✓ **Predicted answer**
- C. Newton
- D. Pascal

Why this answer? Energy is measured in joules; the watt is the unit of power.

Why predicted [C] — Syllabus anchor: syllabus anchor — units recur (37m Q137: one calorie is equal to 4.18 J; 37ahq Q170: 10 pascal is equal to 0.000098 atm). Standard textbook fact.

Question 119 Chemistry

Which gas is released at the anode during the electrolysis of water?

- A. Hydrogen
- B. Oxygen ✓ **Predicted answer**
- C. Chlorine
- D. Nitrogen

Why this answer? In water electrolysis, oxygen is liberated at the anode and hydrogen at the cathode.

Why predicted [C] — Syllabus anchor: syllabus anchor — electrolysis and electrochemistry recur (37m Q141: electrochemistry deals with conversion of electrical and chemical energy; 37m Q139: standard electrode potential). Standard textbook fact.

Question 120 Chemistry

In Haber's process, the yield of ammonia can be maximised by:

- A. Continuous addition of ammonia

tinuous withdrawal of ammonia ✓ **Predicted answer**

- C. Decreasing the pressure
- D. Increasing the temperature

Why this answer? Removing ammonia as it forms shifts the equilibrium forward; adding ammonia would push it back.

Why predicted [A] — Repeated question: repeated — 37m Q129 and 37ahq Q137 all key continuous withdrawal of ammonia (37ahq Q137 keys that continuous addition of NH3 is NOT true for increasing synthesis). Also asked as: 37m Q129: “For the chemical reaction: N2(g) + 3H2(g) ⇌ 2NH3(g) + Heat. We can get maximize the yield of NH3:”; 37ahq Q137: “Which of the following is not true for increase in synthesis of ammonia by Haber's process?”

Question 121 Chemistry

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

- A. Carboxylic acid > phenol > water > alcohol ✓ **Predicted answer**
- B. Phenol > carboxylic acid > water > alcohol
- C. Alcohol > water > phenol > carboxylic acid
- D. Water > alcohol > phenol > carboxylic acid

Why this answer? Carboxylic acids are the strongest acids of the four, and alcohols the weakest.

Why predicted [A] — Repeated question: repeated — 37m Q175 and 37ahq Q154 all key Carboxylic acid > phenol > water > alcohol. Also asked as: 37m Q175: “Select the correct order of relative acidic strength of phenol, alcohol, water, and carboxylic acid:”; 37ahq Q154: “The relative acidic strength of phenol, water, alcohol & carboxylic acid is:”

122 Chemistry

The binding energy of transition metals increases up to group:

- A. II B
- B. VI B ✓ **Predicted answer**
- C. VIII
- D. I B

Why this answer? Binding energy of transition metals rises to a maximum around group VI B and then falls.

Why predicted [B] — Verified fact, predicted to recur: 37m Q150 (VERIFIED) — VI B.

Question 123 Chemistry

Homo-cyclic organic compounds are subdivided into two groups, namely:

- A. Alicyclic and aromatic ✓ **Predicted answer**
- B. Aliphatic and aromatic
- C. Cyclic and acyclic
- D. Saturated and unsaturated

Why this answer? Homocyclic compounds are rings of carbon atoms only, split into alicyclic and aromatic classes.

Why predicted [B] — Verified fact, predicted to recur: 37m Q151 (VERIFIED) — Alicyclic and Aromatic.

Question 124 Chemistry

In alkanes, each carbon has hybridisation:

- A. sp
- B. sp2
- C. sp3 ✓ **Predicted answer**

Why this answer? Alkane carbons form four single bonds, so each is sp3 hybridised.

Why predicted [B] — Verified fact, predicted to recur: 37m Q153 (VERIFIED) — Sp3.

Question 125 Chemistry

For the reaction N2 + 3H2 ⇌ 2NH3, how many moles of N2 are required for the synthesis of 4 moles of NH3?

- A. 1 mole
- B. 2 moles ✓ **Predicted answer**
- C. 3 moles
- D. 4 moles

Why this answer? The equation needs 1 mole of N2 for 2 moles of NH3, so 4 moles of NH3 need 2 moles of N2.

Why predicted [B] — Verified fact, predicted to recur: 37m Q154 (VERIFIED) — 2 moles of N2.

Question 126 Chemistry

Aluminium reacts with oxygen: 4Al + 3O2 → 2Al2O3. 27 g of Al will react with how much oxygen?

- A. 12 g
- B. 24 g ✓ **Predicted answer**
- C. 32 g
- D. 48 g

Why this answer? 4 moles of Al (108 g) need 3 moles of O2 (96 g), so 27 g of Al needs 24 g of oxygen.

Why predicted [B] — Verified fact, predicted to recur: 37m Q155 (VERIFIED) — 24 g.

127 Chemistry

One mole of a substance is the amount that has the same number of particles as:

- A. 1 g of hydrogen
- B. 12 g of carbon-12 isotopes ✓ **Predicted answer**
- C. 16 g of oxygen
- D. 22.4 g of nitrogen

Why this answer? The mole is defined by 12 g of carbon-12, which contains Avogadro's number of atoms.

Why predicted [B] — Verified fact, predicted to recur: 37m Q156 (VERIFIED) — 12 g of carbon-12 isotopes.

Question 128 Chemistry

The principal quantum number is represented by the symbol:

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

Why this answer? The principal quantum number, which gives the shell and energy level, is denoted n.

Why predicted [B] — Verified fact, predicted to recur: 37m Q157 (VERIFIED) — n.

Question 129 Chemistry

The shape of a subshell is explained by which quantum number?

- A. Principal quantum number
- B. Azimuthal quantum number ✓ **Predicted answer**
- C. Magnetic quantum number

n quantum number

Why this answer? The azimuthal quantum number (l) determines the shape of the subshell.

Why predicted [B] — Verified fact, predicted to recur: 37m Q158 (VERIFIED) — Azimuthal quantum number.

Question 130 Chemistry

The electronic configuration for degenerate orbitals is explained by:

- A. Aufbau principle
- B. Pauli exclusion principle
- C. Hund's rule ✓ **Predicted answer**
- D. Heisenberg principle

Why this answer? Hund's rule states that degenerate orbitals are filled singly first, with parallel spins.

Why predicted [B] — Verified fact, predicted to recur: 37m Q159 (VERIFIED) — Hund’s rule.

Question 131 Chemistry

The maximum number of electrons that can be placed in one orbital is:

- A. 1
- B. 2 ✓ **Predicted answer**
- C. 4
- D. 8

Why this answer? By the Pauli exclusion principle, one orbital holds at most two electrons, with opposite spins.

Why predicted [B] — Verified fact, predicted to recur: 37m Q160 (VERIFIED) — 2

132 Chemistry

Air is a mixture of gases. The molecules of air do not settle down due to:

- A. Gravity
- B. Elastic collision of gas molecules ✓ **Predicted answer**
- C. Low density
- D. Wind

Why this answer? Gas molecules keep moving by continuous elastic collisions, so they do not settle.

Why predicted [B] — Verified fact, predicted to recur: 37m Q161 (VERIFIED) — Elastic collision of gas molecules.

Question 133 Chemistry

According to Charles's law, the volume of a gas reduces to zero at:

- A. 0 °C
- B. −100 °C
- C. −273.15 °C ✓ **Predicted answer**
- D. −50 °C

Why this answer? Extrapolating Charles's law gives zero volume at absolute zero, −273.15 °C.

Why predicted [B] — Verified fact, predicted to recur: 37m Q163 (VERIFIED) — -273.15 O C.

Question 134 Chemistry

The strongest hydrogen bond is present in:

- A. H2O
- B. NH3

- D. HCl

Why this answer? Fluorine is the most electronegative atom, so HF forms the strongest hydrogen bonds.

Why predicted [B] — Verified fact, predicted to recur: 37m Q164 (VERIFIED) — HF.

Question 135 Chemistry

Which of the following has the highest surface tension?

- A. Alcohol
- B. Benzene
- C. Water ✓ **Predicted answer**
- D. Ether

Why this answer? Water's strong hydrogen bonding gives it the highest surface tension of the common liquids.

Why predicted [B] — Verified fact, predicted to recur: 37m Q165 (VERIFIED) — Water.

Question 136 Chemistry

Which of the following has the highest boiling point?

- A. C5H12
- B. C10H22 ✓ **Predicted answer**
- C. C2H6
- D. CH4

Why this answer? Boiling point rises with chain length and molecular mass, so decane boils highest.

Why predicted [B] — Verified fact, predicted to recur: 37m Q166 (VERIFIED) — C10H22.

137 Chemistry

Ice floats on the surface of water due to:

- A. High density of ice
- B. Empty spaces in the structure of ice ✓ **Predicted answer**
- C. Surface tension
- D. Low temperature

Why this answer? Ice has an open lattice with empty spaces, so it is less dense than water and floats.

Why predicted [B] — Verified fact, predicted to recur: 37m Q167 (VERIFIED) — Empty spaces in the structure of ice.

Question 138 Chemistry

Which of the following is NOT oxidised by any oxidising agent?

- A. Toluene
- B. Benzene ✓ **Predicted answer**
- C. Phenol
- D. Aniline

Why this answer? The aromatic ring of benzene resists oxidation by ordinary oxidising agents.

Why predicted [B] — Verified fact, predicted to recur: 37m Q168 (VERIFIED) — Benzene.

Question 139 Chemistry

What is the pH of pure water at 25 °C?

- A. 0
- B. 5
- C. 7 ✓ **Predicted answer**

Why this answer? Pure water at 25 °C is neutral, with equal H+ and OH− concentrations, so pH 7.

Why predicted [C] — Syllabus anchor: syllabus anchor — acids and equilibria recur (37m Q175: relative acidic strength of phenol, alcohol, water and carboxylic acid; 37ahq Q154: relative acidic strength of phenol, water, alcohol and carboxylic acid). Standard textbook fact.

Question 140 Chemistry

Which element is the most abundant in the Earth's crust?

- A. Silicon
- B. Aluminium
- C. Iron
- D. Oxygen ✓ **Predicted answer**

Why this answer? Oxygen makes up about 47% of the Earth's crust by mass, more than any other element.

Why predicted [C] — Syllabus anchor: syllabus anchor — elements and periodic trends recur (37m Q143: ionisation energy decreases down the group; 37ahq Q125: shielding effect). Standard textbook fact.

Question 141 Physics

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

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

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

Why predicted [B] — Verified fact, predicted to recur: 37m Q111 (VERIFIED) — Energy.

Question 142 Physics

In deriving Bernoulli's equation, the quantity ' pressure x volume' represents:

- A. kinetic energy
- B. potential energy
- C. work done ✓ **Predicted answer**
- D. density

Why this answer? correct: in Bernoulli's equation, pressure × volume represents work done (pressure energy) — the work done in pushing the fluid.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q132 (VERIFIED) — work done.

Question 143 Physics

An ideal gas is heated at constant volume. It absorbs 200 J of heat. The work done by the gas is:

- A. 200 J
- B. 0 J ✓ **Predicted answer**
- C. -200 J
- D. Varies with pressure

Why this answer? correct: at constant volume $\Delta V = 0$, so the work done by the gas $W = P\Delta V = 0$ J (all 200 J goes into internal energy).

Why predicted [B] — Verified fact, predicted to recur: 37ada Q138 (VERIFIED) — 0 J.

144 Physics

A car doubles its speed from 20 m/s to 40 m/s. Its kinetic energy becomes:

- A. Eight times
- B. Two times
- C. Three times
- D. Four times ✓ **Predicted answer**

Why this answer? Kinetic energy = ½mv², so it depends on the square of the speed: doubling v multiplies the energy by $2^2 = 4$.

Why predicted [C] — Syllabus anchor: syllabus anchor — kinetic energy recurs (37ada Q128: velocity doubled, kinetic energy). Standard textbook fact.

Question 145 Physics

Two projectiles are fired with the same speed, one at 30° and the other at 60° to the horizontal. How do their horizontal ranges compare?

- A. Both have the same maximum height
- B. The 30° projectile goes further
- C. The 60° projectile goes further
- D. Both have the same range ✓ **Predicted answer**

Why this answer? Range $R = v^2 \cdot \sin(2\theta)/g$; sin(60°) = sin(120°), so complementary angles give equal ranges (the 60° projectile reaches a greater height, but not a greater range).

Why predicted [C] — Syllabus anchor: syllabus anchor — projectile motion recurs (37ada Q148: projectile motion). Standard textbook fact.

Question 146 Physics

The unit of kinetic energy is the same as that of:

- A. Power

- k ✓ **Predicted answer**
- C. Momentum
- D. Force

Why this answer? Kinetic energy and work are both measured in joules.

Why predicted [B] — Verified fact, predicted to recur: 37m Q69 (VERIFIED) — Work.

Question 147 Physics

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

- A. Force of gravity
- B. Force of friction ✓ **Predicted answer**
- C. Normal reaction
- D. Air resistance

Why this answer? Friction between the tyres and the road supplies the centripetal force for turning.

Why predicted [B] — Verified fact, predicted to recur: 37m Q70 (VERIFIED) — Force of friction.

Question 148 Physics

How many radians are in one degree?

- A. 0.0174 rad ✓ **Predicted answer**
- B. 0.174 rad
- C. 1.74 rad
- D. 57.3 rad

Why this answer? One degree equals π/180 radians, about 0.0174 rad.

Why predicted [B] — Verified fact, predicted to recur: 37m Q71 (VERIFIED) — 0.0174 rad.

149 Physics

What is the angular velocity of an electric motor if it rotates at 400 rpm?

- A. 41.9 rad/s ✓ **Predicted answer**
- B. 400 rad/s
- C. 20 rad/s
- D. 6.28 rad/s

Why this answer? ω = 2π × 400/60 ≈ 41.9 rad/s.

Why predicted [B] — Verified fact, predicted to recur: 37m Q72 (VERIFIED) — 41.9 rad/s.

Question 150 Physics

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

- A. $F_c = mv^2/r$
- B. $F_c = mr\omega^2$ ✓ **Predicted answer**
- C. $F_c = m\omega/r$
- D. $F_c = mr^2\omega$

Why this answer? Centripetal force equals mass × radius × angular velocity squared.

Why predicted [B] — Verified fact, predicted to recur: 37m Q74 (VERIFIED) — F c = m r ω^2.

Question 151 Physics

What is the angular speed, in radians per hour, of the daily rotation of the Earth?

- A. π/6
- B. π/12 ✓ **Predicted answer**
- C. π/24
- D. 2π

swer? The Earth turns 2π radians in 24 hours, so π/12 rad per hour.

Why predicted [B] — Verified fact, predicted to recur: 37m Q75 (VERIFIED) — π /12.

Question 152 Physics

The wavelength of a wave is defined as the:

- A. Distance between a crest and a trough
- B. Distance between two consecutive crests ✓ **Predicted answer**
- C. Height of the wave
- D. Time for one oscillation

Why this answer? Wavelength is the distance between two identical points on successive waves.

Why predicted [B] — Verified fact, predicted to recur: 37m Q76 (VERIFIED) — Distance between two consecutive crests.

Question 153 Physics

Which factor does NOT affect the speed of sound in air?

- A. Temperature
- B. Pressure ✓ **Predicted answer**
- C. Humidity
- D. Density

Why this answer? The speed of sound in air depends on temperature (and humidity), not on pressure.

Why predicted [B] — Verified fact, predicted to recur: 37m Q77 (VERIFIED) — Pressure.

Question 154 Physics

Ultrasonic waves have a frequency higher than:

- B. 20 kHz ✓ **Predicted answer**
- C. 200 kHz
- D. 2 MHz

Why this answer? Ultrasound is sound above the human hearing limit of about 20 kHz.

Why predicted [B] — Verified fact, predicted to recur: 37m Q79 (VERIFIED) — 20 KHz.

Question 155 Physics

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

- A. 0.61 m/s ✓ **Predicted answer**
- B. 6.1 m/s
- C. 0.061 m/s
- D. 61 m/s

Why this answer? The speed of sound in air rises by about 0.61 m/s per degree Celsius.

Why predicted [B] — Verified fact, predicted to recur: 37m Q80 (VERIFIED) — 0.61 m/s.

Question 156 Physics

A continuous, regular and rhythmic disturbance in a medium, resulting from the periodic vibration of a source, causes:

- A. Standing waves
- B. Periodic waves ✓ **Predicted answer**
- C. Shock waves
- D. Transverse waves only

Why this answer? A regularly vibrating source produces periodic waves in the medium.

Why predicted [B] — Verified fact, predicted to recur: 37m Q81 (VERIFIED) — Periodic waves.

157 Physics

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

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

Why this answer? An isochoric process takes place at constant volume.

Why predicted [B] — Verified fact, predicted to recur: 37m Q82 (VERIFIED) — Isochoric.

Question 158 Physics

The internal energy of a system during an isothermal process:

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

Why this answer? In an isothermal process the temperature (and hence the internal energy of an ideal gas) stays constant.

Why predicted [B] — Verified fact, predicted to recur: 37m Q84 (VERIFIED) — Remains constant.

Question 159 Physics

Electric intensity due to charge distributions is calculated using which law?

- A. Coulomb's law
- B. Gauss's law ✓ **Predicted answer**
- C. Ohm's law

Why this answer? Gauss's law relates the electric flux through a surface to the charge it encloses.

Why predicted [B] — Verified fact, predicted to recur: 37m Q85 (VERIFIED) — Gauss’s law.

Question 160 Physics

A transformer works on the principle of:

- A. Mutual induction ✓ **Predicted answer**
- B. Self-induction
- C. Lenz's law
- D. Fleming's rule

Why this answer? A changing current in the primary induces a voltage in the secondary by mutual induction.

Why predicted [A] — Repeated question: repeated — 37m Q109 and 37ahq Q28 all key Mutual induction. Also asked as: 37m Q109: “Transformer works on the principle of:”; 37ahq Q28: “Transformer works on the principle of:”

Question 161 Physics

Which device converts alternating current into direct current?

- A. Diode ✓ **Predicted answer**
- B. Transistor
- C. Capacitor
- D. Inductor

Why this answer? A diode allows current in one direction only, so it rectifies AC into DC.

Why predicted [A] — Repeated question: repeated — 37m Q114 and 37ahq Q33 all key

asked as: 37m Q114: "The conversion of alternating current into direct current is called rectification and circuit is called rectif"; 37ahq Q33: "The device used for rectification is:"

Question 162 Physics

What is the speed of light in a vacuum?

- A. 3 × 10^6 m/s
- B. 3 × 10^7 m/s
- C. 3 × 10^8 m/s ✓ **Predicted answer**
- D. 3 × 10^9 m/s

Why this answer? Light travels at about 3 × 10^8 m/s in a vacuum.

Why predicted [C] — Syllabus anchor: syllabus anchor — light and waves recur (37m Q76: wavelength is the distance between two consecutive crests; 37m Q115: red light is used in a photographic dark room). Standard textbook fact.

Question 163 Physics

Which of the following is the SI unit of electric current?

- A. Volt
- B. Ohm
- C. Ampere ✓ **Predicted answer**
- D. Watt

Why this answer? Electric current is measured in amperes.

Why predicted [C] — Syllabus anchor: syllabus anchor — electrical units recur (37m Q87: the SI unit of potential difference is the volt; 37ahq Q5: 90 C passing in 30 s gives a current of 3 A). Standard textbook fact.

164 Physics

The capacitance of a capacitor does NOT depend on:

- A. Area of the plates
- B. Distance between the plates
- C. Thickness of the plates ✓ **Predicted answer**
- D. Dielectric between the plates

Why this answer? Capacitance depends on plate area, plate separation and the dielectric, not on how thick the plates are.

Why predicted [B] — Verified fact, predicted to recur: 37m Q86 (VERIFIED) — Thickness of plates.

Question 165 Physics

The SI unit of potential difference is the:

- A. Ampere
- B. Ohm
- C. Volt ✓ **Predicted answer**
- D. Watt

Why this answer? Potential difference is measured in volts.

Why predicted [B] — Verified fact, predicted to recur: 37m Q87 (VERIFIED) — Volt.

Question 166 Physics

Electric potential is defined as:

- A. Force per unit charge
- B. Work per unit charge ✓ **Predicted answer**
- C. Charge per unit time
- D. Energy per unit volume

Answer: Electric potential is the work done per unit charge in bringing a charge from infinity to a point.

Why predicted [B] — Verified fact, predicted to recur: 37m Q88 (VERIFIED) — Work per unit charge.

Question 167 Physics

Ohm-metre is the unit of:

- A. Resistance
- B. Resistivity ✓ **Predicted answer**
- C. Conductance
- D. Conductivity

Why this answer? Resistivity (ρ) is measured in ohm-metres.

Why predicted [B] — Verified fact, predicted to recur: 37m Q89 (VERIFIED) — Resistivity.

Question 168 Physics

1 eV is equal to:

- A. 1.602 × 10^-19 J ✓ **Predicted answer**
- B. 1.602 × 10^-18 J
- C. 9.11 × 10^-31 J
- D. 3.0 × 10^8 J

Why this answer? One electron-volt is the energy of one electron moved through one volt: 1.602 × 10^-19 J.

Why predicted [B] — Verified fact, predicted to recur: 37m Q90 (VERIFIED) — 1.602 x 10-19 J.

169 Physics

The total resistance of a wire is inversely proportional to its:

- A. Length
- B. Area ✓ **Predicted answer**
- C. Resistivity
- D. Temperature

Why this answer? Resistance R = ρL/A, so it falls as the cross-sectional area rises.

Why predicted [B] — Verified fact, predicted to recur: 37m Q91 (VERIFIED) — Area.

Question 170 Physics

Kilowatt-hour is a unit of:

- A. Power
- B. Energy ✓ **Predicted answer**
- C. Current
- D. Voltage

Why this answer? A kilowatt-hour is the energy used by a 1 kW device in one hour.

Why predicted [B] — Verified fact, predicted to recur: 37m Q92 (VERIFIED) — Energy.

Question 171 Physics

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

- A. 0°
- B. 45°
- C. 90° ✓ **Predicted answer**
- D. 180°

swer? Magnetic force F = qvB sin θ is maximum when the particle enters perpendicular to the field.

Why predicted [B] — Verified fact, predicted to recur: 37m Q93 (VERIFIED) — 90O.

Question 172 Physics

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

- A. Move in a circle
- B. Move straight ✓ **Predicted answer**
- C. Move in a helix
- D. Come to rest

Why this answer? With no angle between velocity and field, sin θ = 0, so no magnetic force acts and the particle moves straight.

Why predicted [B] — Verified fact, predicted to recur: 37m Q94 (VERIFIED) — Move straight.

Question 173 Physics

Two balls collide and the collision is elastic. Which statement is true?

- A. Momentum is lost
- B. K.E. before collision = K.E. after collision ✓ **Predicted answer**
- C. K.E. after collision is zero
- D. Both balls stop

Why this answer? In an elastic collision kinetic energy is conserved.

Why predicted [B] — Verified fact, predicted to recur: 37m Q95 (VERIFIED) — K.E before collision = K.E after collision.

174 Physics

The gradient of a velocity-time graph is equal to:

- A. Displacement
- B. Acceleration ✓ **Predicted answer**
- C. Speed
- D. Distance

Why this answer? The slope of velocity against time gives the rate of change of velocity, i.e. acceleration.

Why predicted [B] — Verified fact, predicted to recur: 37m Q96 (VERIFIED) — Acceleration.

Question 175 Physics

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

- A. 30°, 45°
- B. 60°, 30° ✓ **Predicted answer**
- C. 45°, 90°
- D. 15°, 75°

Why this answer? Complementary angles (adding to 90°) give equal projectile ranges.

Why predicted [B] — Verified fact, predicted to recur: 37m Q97 (VERIFIED) — 60O, 30O.

Question 176 Physics

Two cars travel on a straight road in opposite directions at 70 km/h and 60 km/h. Their relative velocity is:

- A. 10 km/h
- B. 65 km/h
- C. 130 km/h ✓ **Predicted answer**

Why this answer? For opposite directions the relative speed is the sum: 70 + 60 = 130 km/h.

Why predicted [B] — Verified fact, predicted to recur: 37m Q98 (VERIFIED) — 130 kmh-1.

Question 177 Physics

Two bodies of the same mass undergo an elastic collision. After the collision their velocities will be:

- A. Both zero
- B. Unchanged
- C. v1' = v2 and v2' = v1 ✓ **Predicted answer**
- D. Both doubled

Why this answer? In an elastic collision between equal masses, the bodies exchange velocities.

Why predicted [B] — Verified fact, predicted to recur: 37m Q99 (VERIFIED) — v1' = v2 v2' = v1.

Question 178 Physics

Which photons carry the most energy?

- A. Red
- B. Violet ✓ **Predicted answer**
- C. Green
- D. Yellow

Why this answer? Violet light has the shortest wavelength and highest frequency, so its photons carry the most energy.

ed [A] — Repeated question: repeated — 37m Q116 and 37ahq Q36 all key Violet. Also asked as: 37m Q116: “Which photons carries the most energy?”; 37ahq Q36: “Which photons carry the most energy?”

Question 179 Physics

The conditions for the application of Boyle's law hold good in a:

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

Why this answer? Boyle's law (P·V = constant) applies at constant temperature.

Why predicted [A] — Repeated question: repeated — 37m Q83 and 37ada Q139 all key Isothermal process. Also asked as: 37m Q83: “The conditions for application of Boyle’s law holds good in:”; 37ada Q139: “Boyle’s law is applicable in which process?”

Question 180 Physics

A car travels 100 km in 2 hours. Its average speed is:

- A. 25 km/h
- B. 50 km/h ✓ **Predicted answer**
- C. 100 km/h
- D. 200 km/h

Why this answer? Average speed = distance ÷ time = 100 ÷ 2 = 50 km/h.

Why predicted [C] — Syllabus anchor: syllabus anchor — speed and motion recur (37m Q96: the gradient of a velocity-time graph is acceleration; 37m Q98: relative velocity of two cars). Standard textbook fact, worked answer.

181 English

The students, along with their teacher, _____ leaving now.

- A. is
- B. are ✓ **Predicted answer**
- C. was
- D. has been

Why this answer? The subject is the plural "students"; the phrase "along with their teacher" does not change the number of the verb.

Why predicted [A] — Repeated question: repeated — 37ahq Q192 and 37ada Q169 all key Are. Also asked as: 37ahq Q192: “The students, accompanied by the teacher _____ entering the museum”; 37ada Q169: “The students, along with their teacher, _____ leaving now.”

Question 182 English

What does the word RELUCTANT mean?

- A. Hesitant ✓ **Predicted answer**
- B. Eager
- C. Willing
- D. Proud

Why this answer? Reluctant means unwilling or hesitant to do something.

Why predicted [A] — Repeated question: repeated — 37ahq Q177 and 37ada Q170 all key Hesitant/Hesitation. Also asked as: 37ahq Q177: “The word 'RELUCTANT' means:”; 37ada Q170: “What does “reluctance” mean in this context?”

Question 183 English

The word RITUAL means:

- B. Custom ✓ **Predicted answer**
- C. Prayer
- D. Ceremony

Why this answer? A ritual is an established custom or regular practice.

Why predicted [B] — Verified fact, predicted to recur: 37m Q181 (VERIFIED) — Custom.

Question 184 English

Choose the correct spelling:

- A. Rennaissance
- B. Renaissance ✓ **Predicted answer**
- C. Renaisance
- D. Renaissanse

Why this answer? The correct spelling is R-e-n-a-i-s-s-a-n-c-e.

Why predicted [B] — Verified fact, predicted to recur: 37m Q182 (VERIFIED) — Renaissance.

Question 185 English

The word CREDENTIALS means:

- A. Certificates
- B. Qualifications ✓ **Predicted answer**
- C. References
- D. Documents

Why this answer? Credentials are the qualifications that show a person is suitable for a job or position.

Why predicted [B] — Verified fact, predicted to recur: 37m Q194 (VERIFIED) —

Question 186 English

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

- A. Assertive
- B. Interrogative
- C. Exclamatory ✓ **Predicted answer**
- D. Imperative

Why this answer? A sentence expressing strong feeling with an exclamation mark is exclamatory.

Why predicted [B] — Verified fact, predicted to recur: 37m Q188 (VERIFIED) — Exclamatory.

Question 187 English

The SYNONYM of "Apparel" is:

- A. Dress ✓ **Predicted answer**
- B. Food
- C. House
- D. Jewellery

Why this answer? Apparel means clothing or dress.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q178 (VERIFIED) — Dress.

Question 188 English

Fill in the blank with the appropriate article. It is _____ honour for me to address you.

- A. A
- B. An ✓ **Predicted answer**

- D. No article

Why this answer? "Honour" begins with a silent h and a vowel sound, so it takes "an".

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q181 (VERIFIED) — An.

Question 189 English

Choose the synonym of BRAVE.

- A. Cowardly
- B. Courageous ✓ **Predicted answer**
- C. Weak
- D. Cruel

Why this answer? Brave means courageous — showing no fear in danger.

Why predicted [C] — Syllabus anchor: syllabus anchor — vocabulary and synonym items recur (37m Q181: ritual means custom; 37ahq Q178: the synonym of apparel is dress). Standard fact.

Question 190 English

Choose the correct spelling:

- A. Occurence
- B. Ocurrence
- C. Occurrence ✓ **Predicted answer**
- D. Occurrance

Why this answer? The correct spelling is O-c-c-u-r-r-e-n-c-e.

Why predicted [C] — Syllabus anchor: syllabus anchor — spelling items recur (37m Q182: Renaissance; 37m Q183: Expedient; 37ada Q167: Nuisance). Standard fact.

191 Logical Reasoning

I. Heavy rain flooded the roads. II. Traffic jams increased across the city. What is the relationship between the two statements?

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

Why this answer? The flooding caused the traffic jams.

Why predicted [A] — Repeated question: repeated — 37m Q124 and 37ahq Q199 all key Statement I is the cause and statement II is its effect. Also asked as: 37m Q124: “I. The government has increased the taxes on all bussinesses in pakistan. II. Many small businesses will have to close down.”; 37ahq Q199: “I. There is sharp decline in the production of oil seeds this year. II. The Government has decided to increase the import of oil seeds.”

Question 192 Logical Reasoning

All hammers are tools. Some tools are useless things. All useless things are trash. Which conclusions are NECESSARILY TRUE? Conclusions: I. Some hammers are trash. II. Some tools are trash. III. All useless things are tools.

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

Why this answer? Some tools are useless things and all useless things are trash, so some tools are trash; the other conclusions do not follow necessarily.

Why predicted [B] — Verified fact, predicted to recur: 37m Q126 (VERIFIED) — II.

193 Logical Reasoning

A ball is a sphere. All spheres are round. Some round things are mesmerising. Which conclusion is NECESSARILY TRUE? Conclusions: I. All balls are mesmerising. II. All round things are spheres. III. Some mesmerising things are spheres.

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

Why this answer? Some round things are mesmerising and all spheres are round, so some mesmerising things are spheres (via the round things that are spheres); the other conclusions do not follow.

Why predicted [B] — Verified fact, predicted to recur: 37ahq Q198 (VERIFIED) — III.

Question 194 Logical Reasoning

If you work hard, you will pass the exam. Which of the following can be deduced? I: If you don't work hard, you will not pass the exam. II: If you don't pass the exam, you have not worked hard.

- A. only I
- B. only II ✓ **Predicted answer**
- C. both I and II
- D. neither I nor II

Why this answer? The contrapositive (not passing implies not working hard) follows; denying the antecedent (I) does not.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q174 (VERIFIED) — only II.

195 Logical Reasoning

Statement: A hospital staff shortage is causing long patient waiting times. Course of Action: I. Hire temporary staff and reschedule duties to manage the patient's workload. II. Close the hospital until full staffing is restored. Which course of action follows?

- A. Only I follows ✓ **Predicted answer**
- B. Only II follows
- C. Both I and II follow
- D. Neither follows

Why this answer? Hiring temporary staff addresses the shortage; closing the hospital is not a workable response.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q176 (VERIFIED) — Only I follows.

Question 196 Logical Reasoning

Initially, a quantity of liquid is 160 ml and it reduces by half every hour. How much liquid remains after 2 hours?

- A. 80 ml
- B. 40 ml ✓ **Predicted answer**
- C. 20 ml
- D. 120 ml

Why this answer? After one hour 80 ml remains, and after two hours half of that: 40 ml.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q172 (VERIFIED) — 40 ml.

Question 197 Logical Reasoning

An item originally costs Rs. 2500. After a 10% price increase, what is the new price?

- A. Rs. 2600

2750 ✓ **Predicted answer**

- C. Rs. 2700
- D. Rs. 3000

Why this answer? A 10% increase on 2500 is 250, so the new price is 2750.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q173 (VERIFIED) — Rs. 2750.

Question 198 Logical Reasoning

If 5 is subtracted from 30, what will be the square root of the remainder?

- A. 25
- B. 5 ✓ **Predicted answer**
- C. 6
- D. 10

Why this answer? 30 − 5 = 25, and the square root of 25 is 5.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q175 (VERIFIED) — 5.

Question 199 Logical Reasoning

In how many ways can four persons A, B, C and D stand in a line, if B must be first and D must be third?

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

Why this answer? With B fixed first and D fixed third, only A and C can swap in the remaining two places: 2 ways.

Why predicted [B] — Verified fact, predicted to recur: 37ada Q179 (VERIFIED) — 2.

200 Logical Reasoning

Find the next number in the series: 2, 6, 12, 20, 30, …?

- A. 36
- B. 40
- C. 42 ✓ **Predicted answer**
- D. 44

Why this answer? The differences are +4, +6, +8, +10, so the next difference is +12; 30 + 12 = 42.

Why predicted [C] — Syllabus anchor: syllabus anchor — number and pattern series recur (37ahq Q195: pattern sequence; 37ada Q172: a quantity halving every hour). New series, worked answer.

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