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

Body: Pakistan Medical & Dental Council (PMDC, UHS) · **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 (UHS), 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, UHS) 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 UHS's own 2027 sitting, built ONLY on verified UHS past papers (2010, 2011, 2013, 2023, 2024, 2025, 2026).

> **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 Do not quote any item as "asked in the 2027 exam" — nothing here has been asked yet.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

Which organelle will increase in number, in muscles of athlete?

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

swer? correct: athletic training raises the muscles' demand for aerobic energy, so muscle cells produce more mitochondria.

Why predicted [A] — Repeated question: repeated — 37za Q10 and 37r Q38 all key Mitochondria. Also asked as: 37za Q10: “During active transport across the cell membrane, a cell requires a continuous supply of ATP to move substances against the concentration gradient. The organelle responsible for producing this energy is:” Also asked as: 37r Q38: “An active athlete has more stamina of running compared to an officer of same age with physically inactive lifestyle. Which of the following organelles has greatly increased in the muscle cells of athlete?”

Question 2 Biology

The cells which play very important role in developing immunity are:

- A. Thrombocytes
- B. Monocytes
- C. Neutrophils
- D. Lymphocytes ✓ **Predicted answer**

Why this answer? B cells produce antibodies and T cells mediate cell-mediated immunity and memory — the cells of specific, adaptive immunity; correct.

Why predicted [A] — Repeated question: repeated — 37za Q68 and 37ahn Q199 all key Lymphocytes. Also asked as: 37za Q68: “What type of blood cells are primarily and specifically responsible for specific immunity?” Also asked as: 37ahn Q199: “Antibodies are produced against invading cells by:”

Question 3 Biology

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

- A. Prolactin

- C. Estrogen
- D. Oxytocin ✓ **Predicted answer**

Why this answer? Uterine contractions, milk ejection, pair/social bonding; correct.

Why predicted [A] — Repeated question: repeated — 37m2 Q24 and 37p Q49 all key Oxytocin. Also asked as: 37p Q49: “Which one of the following hormone is responsible for the labor pains in human female at the time of birth of baby?”

Question 4 Biology

Enzymes are:

- A. Lipids
- B. Can be lipids or proteins
- C. Carbohydrates
- D. Proteins ✓ **Predicted answer**

Why this answer? correct: enzymes are proteins (with a few RNA exceptions).

Why predicted [A] — Repeated question: repeated — 37r Q33 and 37ahn Q192 all key Proteins. Also asked as: 37r Q33: “Enzymes belong to which class of biomolecules?” Also asked as: 37ahn Q192: “Chemically insulin and glucagon are:”

Question 5 Biology

Translation is:

- A. nucleus → tRNA → ribosome
- B. nucleus → mRNA → ER
- C. nucleus → tRNA → ER
- D. nucleus → mRNA → ribosome ✓ **Predicted answer**

Why this answer? correct: mRNA is transcribed in the nucleus and travels to a ribosome,

anslated into a polypeptide.

Why predicted [B] — Verified fact, predicted to recur: 37za Q78 (VERIFIED) — nucleus → mRNA → ribosome.

Question 6 Biology

If two genes are said to be linked, what is meant by the term 'linked'?

- A. Two genes both occupy the same chromosome ✓ **Predicted answer**
- B. They are both alleles of the same gene
- C. The phenotypes of the genes are both influenced by the gender of their owner
- D. Two genes are both at the same loci on a chromosome

Why this answer? correct: linked genes are carried on the same chromosome, so they tend to be inherited together.

Why predicted [B] — Verified fact, predicted to recur: 37za Q12 (VERIFIED) — Two genes both occupy the same chromosome.

Question 7 Biology

Polysaccharides in plants are synthesized by the process of

- A. Glycolysis
- B. Hydrolysis
- C. Oxidation
- D. Condensation ✓ **Predicted answer**

Why this answer? Monosaccharides join by condensation (dehydration) reactions, losing water to form glycosidic bonds; correct.

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

8 Biology

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

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

Why this answer? The unique 3-D folding of ONE polypeptide chain; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q11 (VERIFIED) — Tertiary structure of protein.

Question 9 Biology

Let X, Y and Z be three amino acids which are encoded by UCA=X, ACU=Y and GUC=Z. What will be the sequence of nucleotide in DNA coding/sense strand that comprises information for following polypeptide: Polypeptide= Y-X-Y-Y-X-Z-Z-X-Z-Y

- A. 3′-TGAAGTTGATGAAGTCAGCAGAGTCAGTGA-5′
- B. 3′-UGAAGUUGAUGAAGUCAGCAGAGUCAGUGA-5′
- C. 5′-ACUUCAACUACUUCAGUCGUCUCAGUCACU-3′
- D. 5′-ACTTCAACTACTTCAGTCGTCTCAGTCACT-3′ ✓ **Predicted answer**

Why this answer? correct: the coding strand has the same sequence as the mRNA with T in place of U, so ACU→ACT, UCA→TCA, GUC→GTC, giving ACT-TCA-ACT-ACT-TCA-GTC-GTC-TCA-GTC-ACT.

Why predicted [B] — Verified fact, predicted to recur: 37za Q38 (VERIFIED) — 5′-ACTTCAACTACTTCAGTCGTCTCAGTCACT-3′.

Question 10 Biology

Which of the following statements best compares cell division in prokaryotic and

cells?

- A. Both use mitosis by cell division
- B. Eukaryotes divide by budding ; prokaryotes by mitosis
- C. Eukaryotes use binary fission ; prokaryotes by meiosis
- D. Eukaryotes divide by mitosis ; prokaryotes by binary fission ✓ **Predicted answer**

Why this answer? Correct general comparison (meiosis being the eukaryotic gamete-forming division).

Why predicted [B] — Verified fact, predicted to recur: 37r Q61 (VERIFIED) — Eukaryotes divide by mitosis ; prokaryotes by binary fission.

Question 11 Biology

Total number of linkage groups in a normal human is:

- A. 46
- B. 92
- C. 02
- D. 23 ✓ **Predicted answer**

Why this answer? One linkage group per chromosome type, i.e. the haploid number 23; correct.

Why predicted [B] — Verified fact, predicted to recur: 37r Q7 (VERIFIED) — 23.

Question 12 Biology

Which of the following bonding or interaction is responsible for quaternary protein folding?

- A. Ester Bond
- B. 1, 6 Glycosidic Bond
- C. 1,4 Glycosidic Bond

Irophobic interaction ✓ **Predicted answer**

Why this answer? correct: the association of separate polypeptide subunits into a quaternary structure is held mainly by hydrophobic interactions between non-polar side chains (with hydrogen bonds and ionic bonds also contributing).

Why predicted [B] — Verified fact, predicted to recur: 37za Q41 (VERIFIED) — Hydrophobic interaction.

Question 13 Biology

When the muscle is at rest, is disposed in such a way that it covers the sites on the chain where the head of becomes attached.

- A. tropomyosin : actin : myosin ✓ **Predicted answer**
- B. myosin : actin : tropomyosin
- C. actin : tropomyosin : myosin
- D. actin : myosin : tropomyosin

Why this answer? correct: at rest, tropomyosin lies over the myosin-binding sites on the actin filament, blocking the myosin heads from attaching.

Why predicted [B] — Verified fact, predicted to recur: 37za Q43 (VERIFIED) — tropomyosin : actin : myosin.

Question 14 Biology

An active athlete has more stamina of running compared to an officer of same age with physically inactive lifestyle. Which of the following organelles has greatly increased in the muscle cells of athlete?

- A. Golgi bodies
- B. Smooth endoplasmic reticulum (SER)
- C. Nucleus
- D. Mitochondria ✓ **Predicted answer**

swer? Endurance training increases mitochondrial number (biogenesis), raising aerobic ATP production and stamina; correct.

Why predicted [B] — Verified fact, predicted to recur: 37r Q37 (VERIFIED) — Mitochondria.

Question 15 Biology

Which of the following are single membranous organelles?

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

Why this answer? All bounded by a SINGLE membrane; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q17 (VERIFIED) — Golgi bodies, Lysosome and ER.

Question 16 Biology

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

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

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

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q23 (VERIFIED) — Acetylcholine.

17 Biology

Which chamber of the heart pumps oxygenated blood out to the whole body?

- A. Right ventricle
- B. Left atrium
- C. Right atrium
- D. Left ventricle ✓ **Predicted answer**

Why this answer? The left ventricle pumps oxygenated blood into the aorta for the whole body, so its muscular wall is the thickest of the four chambers; the right ventricle pumps only to the lungs.

Why predicted [C] — Syllabus anchor: syllabus anchor — heart chambers recur (37za Q24: thickest heart chamber is the left ventricle). Standard textbook fact.

Question 18 Biology

Which organelle 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; the Golgi apparatus modifies and packages proteins, and the nucleus stores the genetic instructions.

Why predicted [C] — Syllabus anchor: syllabus anchor — cell organelles recur (37za Q13: ribosomes in prokaryotes and eukaryotes; 37za Q71: Golgi apparatus). Standard textbook fact.

19 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 (37za Q10: ATP-producing organelle). Standard textbook fact.

Question 20 Biology

Filtration of blood in the kidney takes place in the:

- A. Glomerulus ✓ **Predicted answer**
- B. Loop of Henle
- C. Collecting duct
- D. Renal pelvis

Why this answer? Blood is filtered in the glomerulus, a tuft of capillaries in the Bowman's capsule; the loop of Henle and collecting duct reabsorb water and salts afterwards.

Why predicted [C] — Syllabus anchor: syllabus anchor — glomerulus/nephron recur (37za Q17: blood vessel leaving the glomerulus; 37za Q21: glomerular filtrate). Standard textbook fact.

Question 21 Biology

In which organelle does photosynthesis take place in a plant cell?

oroplast ✓ **Predicted answer**

- B. Vacuole
- C. Mitochondrion
- D. Nucleus

Why this answer? Photosynthesis takes place in the chloroplast, which contains chlorophyll in its thylakoids; mitochondria carry out respiration instead.

Why predicted [C] — Syllabus anchor: syllabus anchor — chloroplast/photosynthesis recur (37p Q43: autotrophic mode of nutrition depends on photosynthesis mode). Standard textbook fact.

Question 22 Biology

Book lungs, the gas-exchange organs of spiders and scorpions, are found in members of the class:

- A. Myriapoda
- B. Insecta
- C. Crustacea
- D. Arachnida ✓ **Predicted answer**

Why this answer? Spiders and scorpions are arachnids, and book lungs are their respiratory organs.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q151 (VERIFIED) — Arachnida.

Question 23 Biology

The larvae of which group resemble chordate larvae, suggesting a close evolutionary link with chordates?

- A. Annelida
- B. Arthropoda

- D. Echinodermata ✓ **Predicted answer**

Why this answer? Echinoderm larvae share features with chordate larvae, pointing to a common deuterostome ancestry.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q152 (VERIFIED) — Echinodermata.

Question 24 Biology

The step-by-step breakdown of carbon-chain molecules inside the cell to release energy is called:

- A. Photorespiration
- B. Photosynthesis
- C. Fermentation
- D. Cellular respiration ✓ **Predicted answer**

Why this answer? Cellular respiration oxidises carbon compounds step by step, releasing usable energy as ATP.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q153 (VERIFIED) — Cellular respiration.

Question 25 Biology

Which instrument measures how strongly different pigments absorb light of different wavelengths?

- A. Barometer
- B. Manometer
- C. Potometer
- D. Spectrophotometer ✓ **Predicted answer**

swer? A spectrophotometer measures light absorption at different wavelengths, so it compares pigment absorption.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q154 (VERIFIED) — Spectrophotometer.

Question 26 Biology

Yeast fermentation of glucose produces ethyl alcohol and:

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

Why this answer? Alcoholic fermentation in yeast converts glucose to ethyl alcohol and carbon dioxide.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q155 (VERIFIED) — Ethyl alcohol, lactic acid, carbon dioxide and water.

Question 27 Biology

In human digestion, the enzyme amylase acts on:

- A. Nucleic acids
- B. Proteins
- C. Lipids
- D. Carbohydrates ✓ **Predicted answer**

Why this answer? Amylase hydrolyses starch and other carbohydrates, beginning in the mouth and continuing in the small intestine.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q156 (VERIFIED) — Digestion of carbohydrates.

28 Biology

The ileocolic sphincter is located at the junction of the:

- A. Ileum and large intestine ✓ **Predicted answer**
- B. Stomach and duodenum
- C. Oesophagus and stomach
- D. Jejunum and ileum

Why this answer? The ileocolic sphincter guards the junction where the ileum meets the large intestine.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q157 (VERIFIED) — At the junction of ileum and large intestine.

Question 29 Biology

Loss of appetite due to fear of becoming obese is termed:

- A. Anorexia nervosa ✓ **Predicted answer**
- B. Obesity
- C. Diabetes mellitus
- D. Bulimia nervosa

Why this answer? Anorexia nervosa is the eating disorder marked by loss of appetite driven by fear of weight gain.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q158 (VERIFIED) — Anorexia nervosa.

Question 30 Biology

Which structure is the functional unit of the human lung, where gas exchange takes place?

- A. Larynx

- C. Trachea
- D. Alveolus ✓ **Predicted answer**

Why this answer? The alveolus (air sac) is the functional unit of the lung, where oxygen and carbon dioxide are exchanged.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q159 (VERIFIED) — Air sac.

Question 31 Biology

Which factor is directly proportional to the oxygen-carrying capacity of haemoglobin?

- A. Temperature
- B. Partial pressure of carbon dioxide
- C. Hydrogen ion concentration
- D. pH ✓ **Predicted answer**

Why this answer? The filed answer is pH: oxygen loading of haemoglobin rises with pH (the Bohr effect works in reverse during loading).

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q160 (VERIFIED) — pH.

Question 32 Biology

Expiration in human beings is brought about by the:

- A. Closure of the glottis
- B. Contraction of the diaphragm
- C. Contraction of the intercostal muscles
- D. Relaxation of intercostal and diaphragm muscles ✓ **Predicted answer**

Why this answer? Quiet expiration is passive: the diaphragm and intercostal muscles relax, the chest cavity shrinks and air is pushed out.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q161 (VERIFIED) —

of intercostal and diaphragm muscles.

Question 33 Biology

Which molecule is the precursor of steroid hormones?

- A. Amino acid
- B. Glucose
- C. Glycerol
- D. Cholesterol ✓ **Predicted answer**

Why this answer? Steroid hormones are synthesised from cholesterol, which carries the four-ring steroid skeleton.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q162 (VERIFIED) — Cholesterol.

Question 34 Biology

Granulocytes, a type of white blood cell, are produced in the:

- A. Liver
- B. Spleen
- C. Lymph nodes
- D. Red bone marrow ✓ **Predicted answer**

Why this answer? Granulocytes are formed in the red bone marrow, like other blood cells.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q163 (VERIFIED) — Red bone marrow.

Question 35 Biology

The sinoatrial node functions by:

- B. Pumping blood into the aorta
- C. Filtering blood in the kidney
- D. Sending out electrical impulses to the atrial muscles causing both atria to contract ✓ **Predicted answer**

Why this answer? The SA node is the heart's pacemaker: its impulses make both atria contract together.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q164 (VERIFIED) — It sends out electrical impulses to atrial muscles causing both atria to contract.

Question 36 Biology

The flow of lymph in lymphatic vessels is maintained by:

- A. Gravity alone
- B. Arterial blood pressure
- C. Heartbeat alone
- D. Breathing movements, activity of skeletal muscles and valves ✓ **Predicted answer**

Why this answer? Lymph has no pump of its own; breathing, skeletal muscle activity and one-way valves move it along.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q165 (VERIFIED) — Breathing movements, activity of skeletal muscles and valves.

Question 37 Biology

The metabolic waste formed from the metabolism of nucleic acids is:

- A. Creatinine
- B. Urea
- C. Ammonia

: acid ✓ **Predicted answer**

Why this answer? Purines from nucleic acids are broken down to uric acid, which is excreted.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q166 (VERIFIED) — Uric acid.

Question 38 Biology

Which organ is described as the central metabolic station and clearing house of the body?

- A. Kidney
- B. Pancreas
- C. Liver ✓ **Predicted answer**
- D. Spleen

Why this answer? The liver processes nutrients, detoxifies blood and regulates metabolism, so it is the body's central metabolic station.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q167 (VERIFIED) — Liver.

Question 39 Biology

The muscles that control the release of urine from the bladder are known as:

- A. Sphincter muscles ✓ **Predicted answer**
- B. Smooth muscles of the gut
- C. Skeletal muscles of the arm
- D. Cardiac muscles

Why this answer? Sphincter muscles guard the bladder outlet and control urination.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q168 (VERIFIED) — Sphincter muscles

40 Biology

The living cells of cartilage are called:

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

Why this answer? Chondrocytes are the living cells embedded in the cartilage matrix.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q169 (VERIFIED) — Chrondrocytes.

Question 41 Biology

The disease causing immobility and fusion of the vertebral joints is:

- A. Rickets
- B. Osteoporosis
- C. Scurvy
- D. Spondylosis ✓ **Predicted answer**

Why this answer? Spondylosis is the degenerative disease in which vertebral joints stiffen and fuse, limiting movement.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q170 (VERIFIED) — Spondylosis.

Question 42 Biology

Human activities in an aquatic ecosystem may accelerate the process of:

- A. Nitrification
- B. Denitrification
- C. Eutrophication ✓ **Predicted answer**

Why this answer? Nutrient run-off from human activity speeds up eutrophication, the nutrient enrichment of water bodies.

Why predicted [A] — Repeated question: repeated — 37ahl Q197 and 37ahs Q146 and 37ahn Q213 all key Eutrophication. Also asked as: 37ahl Q197: “In aquatic ecosystem, human activities may accelerate the process of”; 37ahs Q146: “In aquatic ecosystem, human activities may accelerate the process of”; 37ahn Q213: “In aquatic ecosystem, human activities may accelerate the process of”

Question 43 Biology

An association between two organisms that benefits both partners is called:

- A. Parasitism
- B. Commensalism
- C. Symbiosis ✓ **Predicted answer**
- D. Predation

Why this answer? Symbiosis is a close association in which both organisms benefit.

Why predicted [A] — Repeated question: repeated — 37ahl Q196 and 37ahs Q147 all key Symbiosis. Also asked as: 37ahl Q196: “An association between two organisms benefiting both is called”; 37ahs Q147: “In an ecosystem, mycorrhizae is an example of”

Question 44 Biology

Beri-beri, a deficiency disease of the nervous system and muscles, is caused by the lack of which vitamin?

- A. Vitamin C
- B. Vitamin D
- C. Vitamin B1 (thiamine) ✓ **Predicted answer**
- D. Vitamin A

swer? Beri-beri is the classic thiamine (vitamin B1) deficiency disease.

Why predicted [C] — Syllabus anchor: syllabus anchor — deficiency diseases recur (37ahl Q198: beri-beri is due to nutritional deficiency). Standard textbook fact.

Question 45 Biology

Phenylketonuria (PKU) is an example of:

- A. Inversion
- B. Chromosomal deletion
- C. Polyploidy
- D. Point mutation ✓ **Predicted answer**

Why this answer? PKU is caused by a single-base change in the gene for phenylalanine hydroxylase — a point mutation.

Why predicted [A] — Repeated question: repeated — 37ahn Q218 and 37ahl Q179 and 37ahn Q220 all key Point mutation. Also asked as: 37ahn Q218: “Phenylketonuria is an example of”; 37ahl Q179: “Sickle cell Anaemia is an example of which type of chromosomal defect?”; 37ahn Q220: “The mutation which causes change in the sequence of DNA is called:”

Question 46 Biology

Which enzyme is used to synthesise cDNA from an RNA template?

- A. Reverse transcriptase ✓ **Predicted answer**
- B. Restriction endonuclease
- C. Helicase
- D. DNA ligase

Why this answer? Reverse transcriptase copies RNA into complementary DNA (cDNA).

Why predicted [A] — Repeated question: repeated — 37ahl Q189 and 37za Q2 all key

scriptase. Also asked as: 37ahl Q189: "Gene can be synthesized in laboratory from messenger RNA by using:"; 37za Q2: "This enzyme is used to synthesize cDNA from RNA:"

Question 47 Biology

In a prokaryotic cell, the wall-strengthening material is:

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

Why this answer? The bacterial cell wall is strengthened by peptidoglycan (murein), a polymer of sugars and amino acids.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q205 (VERIFIED) — Peptidoglycan.

Question 48 Biology

The entire bacterial cell wall is often regarded as a single huge molecule or molecular complex called the:

- A. Plasmid
- B. Mesosome
- C. Capsule
- D. Sacculus ✓ **Predicted answer**

Why this answer? The cross-linked peptidoglycan wall of a bacterium behaves as one giant molecule, the sacculus.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q206 (VERIFIED) — Sacculus.

49 Biology

The Krebs cycle takes place in the:

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

Why this answer? The Krebs (citric acid) cycle runs in the mitochondrial matrix.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q207 (VERIFIED) — Mitochondria.

Question 50 Biology

Chemically, viruses are made up of:

- A. Nucleic acid and protein ✓ **Predicted answer**
- B. Lipid and carbohydrate
- C. Protein only
- D. Nucleic acid only

Why this answer? A virus is nucleic acid (DNA or RNA) inside a protein coat.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q208 (VERIFIED) — Nucleic acid and protein.

Question 51 Biology

The widespread epidemic disease influenza is caused by an:

- A. RNA enveloped virus ✓ **Predicted answer**
- B. Bacterium
- C. Fungus
- D. DNA non-enveloped virus

swer? Influenza is caused by an enveloped RNA virus (orthomyxovirus) that spreads in epidemics.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q209 (VERIFIED) — RNA enveloped virus.

Question 52 Biology

When bacterial cells divide in three planes, the arrangement is known as:

- A. Streptococcus
- B. Staphylococcus
- C. Sarcina ✓ **Predicted answer**
- D. Diplococcus

Why this answer? Division in three planes produces cubical packets of eight cells called sarcinae.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q210 (VERIFIED) — Sarcina.

Question 53 Biology

In a bacterial growth curve, the bacterial death rate equals the birth rate during the:

- A. Lag phase
- B. Log phase
- C. Stationary phase ✓ **Predicted answer**
- D. Death phase

Why this answer? In the stationary phase births balance deaths, so the population stays constant.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q211 (VERIFIED) — Stationary phase.

54 Biology

Monomers join together to form a polymer by the process of:

- A. Oxidation
- B. Glycolysis
- C. Hydrolysis
- D. Condensation ✓ **Predicted answer**

Why this answer? Polymerisation joins monomers by condensation, removing a water molecule at each link; hydrolysis is the reverse process.

Why predicted [A] — Repeated question: repeated — 37m2 Q14 and 37p Q13 all key Condensation. Also asked as: 37m2 Q14: “Hydrolysis process is a reverse of ___ process.”; 37p Q13: “Polysaccharides in plants are synthesized by the process of”

Question 55 Biology

The feeding stage of a slime mould is a:

- A. Plasmodium ✓ **Predicted answer**
- B. Spore
- C. Cyst
- D. Mycelium

Why this answer? The feeding stage of a plasmodial slime mould is the multinucleate plasmodium.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q213 (VERIFIED) — Plasmodium.

Question 56 Biology

The drug lovastatin, used for lowering blood cholesterol, is obtained from a:

- A. Fungus ✓ **Predicted answer**

- C. Higher plant
- D. Bacterium

Why this answer? Lovastatin is a statin drug obtained from the fungus Aspergillus terreus.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q214 (VERIFIED) — Lovastatin.

Question 57 Biology

Fungi store their surplus food in the form of:

- A. Cellulose
- B. Sucrose
- C. Starch
- D. Glycogen ✓ **Predicted answer**

Why this answer? Like animals, fungi store surplus food as glycogen, not as starch.

Why predicted [A] — Repeated question: repeated — 37ahl Q215 and 37r Q54 all key Glycogen. Also asked as: 37ahl Q215: “Fungi store surplus food in the form of”; 37r Q54: “Fungi store food in the form of”

Question 58 Biology

The ecological role of fungi as decomposers is paralleled only by:

- A. Bacteria ✓ **Predicted answer**
- B. Protozoa
- C. Viruses
- D. Algae

Why this answer? Fungi and bacteria are the two great decomposer groups in

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q216 (VERIFIED) — Bacteria.

Question 59 Biology

"Vascular system absent; gametophyte dominant, sporophyte attached to gametophyte; homosporous" — these are distinguishing features of:

- A. Pteridophyta
- B. Gymnosperms
- C. Bryophyta ✓ **Predicted answer**
- D. Angiosperms

Why this answer? Bryophytes (mosses, liverworts) have a dominant gametophyte, no vascular tissue, and a dependent sporophyte.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q217 (VERIFIED) — Bryophyta.

Question 60 Biology

Which feature differentiates angiosperms from gymnosperms?

- A. Pollen
- B. Vascular tissue
- C. Seeds
- D. Ovaries ✓ **Predicted answer**

Why this answer? Angiosperms bear their ovules inside ovaries (which become fruits); gymnosperms carry naked seeds.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q218 (VERIFIED) — Ovaries.

61 Biology

Which of the following is an exclusive character of mammals?

- A. Hair ✓ **Predicted answer**
- B. Warm blood
- C. Internal fertilisation
- D. Four-chambered heart

Why this answer? Hair is found only in mammals; the other traits occur in birds or other groups too.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q220 (VERIFIED) — Hair.

Question 62 Biology

Successive stages of eating and being eaten, through which materials are recycled and energy flows, make up a:

- A. Energy pyramid
- B. Niche
- C. Food web
- D. Food chain ✓ **Predicted answer**

Why this answer? A food chain is the sequence of feeding stages linking producers to consumers.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q148 (VERIFIED) — Food Chain.

Question 63 Biology

The sex of individuals in the next generation always depends on the parent who is:

- A. Heterogametic ✓ **Predicted answer**
- B. Homologous

- D. Homogametic

Why this answer? The heterogametic parent (XY in humans) determines the sex of the offspring.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q149 (VERIFIED) — Heterogametic.

Question 64 Biology

Which of the following individuals will be haemophilic?

- A. XHXH
- B. XHXh
- C. XhY ✓ **Predicted answer**
- D. XHY

Why this answer? A male with the recessive haemophilia allele on his single X chromosome (XhY) is haemophilic.

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

Question 65 Biology

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

- A. Colour blindness ✓ **Predicted answer**
- B. Albinism
- C. Polydactyly
- D. ABO blood group

Why this answer? Red-green colour blindness is the classic X-linked recessive trait.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q151 (VERIFIED) — Colour Blindness.

66 Biology

Which human trait is an example of multiple alleles?

- A. Colour blindness
- B. Haemophilia
- C. ABO blood group ✓ **Predicted answer**
- D. Albinism

Why this answer? The ABO blood group is controlled by three alleles (IA, IB, i) at one locus — multiple alleles.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q152 (VERIFIED) — ABO-Blood Group.

Question 67 Biology

When a gene pair at one locus interacts with another gene at another locus, the interaction is called:

- A. Linkage
- B. Crossing over
- C. Epistasis ✓ **Predicted answer**
- D. Codominance

Why this answer? Epistasis is the interaction between genes at different loci, where one masks the effect of another.

Why predicted [A] — Repeated question: repeated — 37ahs Q153 and 37ahl Q187 all key Epistasis. Also asked as: 37ahl Q187: “Epistasis is a relationship between:”; 37ahs Q153: “When a gene pair at one locus interacts with another gene at another locus, the interaction is called”

68 Biology

The combination of a pentose sugar with a base results in a compound known as a:

- A. Nucleoside ✓ **Predicted answer**
- B. Nucleosome
- C. Polynucleotide
- D. Nucleotide

Why this answer? A base plus a pentose sugar is a nucleoside; adding phosphate makes it a nucleotide.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q154 (VERIFIED) — Nucleoside.

Question 69 Biology

An enzyme and its substrate react through a special feature or site present on the enzyme called the:

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

Why this answer? The substrate binds at the enzyme's active site, where the reaction takes place.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q155 (VERIFIED) — Active Site.

Question 70 Biology

The non-protein part of an enzyme that is covalently and permanently bonded to it is called a:

- B. Cofactor
- C. Prosthetic group ✓ **Predicted answer**
- D. Activator

Why this answer? A prosthetic group is permanently and covalently bound to the enzyme protein.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q156 (VERIFIED) — Prosthetic Group.

Question 71 Biology

One of the pyrimidine bases is absent in DNA. Which one?

- A. Cytosine
- B. Thymine
- C. Uracil ✓ **Predicted answer**
- D. Adenine

Why this answer? DNA uses thymine instead of uracil; uracil is found in RNA.

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

Question 72 Biology

Enzymes increase the rate of a reaction by:

- A. Decreasing the activation energy ✓ **Predicted answer**
- B. Increasing the temperature
- C. Decreasing the substrate concentration
- D. Increasing the activation energy

Why this answer? Enzymes lower the activation-energy barrier, so more molecules can react.

ed [B] — Verified fact, predicted to recur: 37ahs Q158 (VERIFIED) — Decreasing Activation Energy.

Question 73 Biology

In bacteria, the genes for drug resistance are usually carried on:

- A. Plasmids ✓ **Predicted answer**
- B. Ribosomes
- C. Mesosomes
- D. Chromosomes

Why this answer? Plasmids are small circular DNA molecules that often carry antibiotic-resistance genes.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q160 (VERIFIED) — Plasmids.

Question 74 Biology

Which fungus causes vaginal thrush in humans?

- A. Aspergillus
- B. Penicillium
- C. Candida ✓ **Predicted answer**
- D. Rhizopus

Why this answer? Candida albicans is the yeast-like fungus that causes thrush.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q162 (VERIFIED) — Candida.

Question 75 Biology

The body cavity of round worms (nematodes) is called a:

- udocoelom ✓ **Predicted answer**
- B. Haemocoel
- C. Blastocoel
- D. Coelom

Why this answer? Nematodes have a false body cavity, the pseudocoelom, between gut and body wall.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q163 (VERIFIED) — Pseudocoelom.

Question 76 Biology

Trypanosoma, the parasite that causes sleeping sickness, is transmitted to humans by the:

- A. Tsetse fly ✓ **Predicted answer**
- B. Sandfly
- C. Housefly
- D. Anopheles mosquito

Why this answer? The tsetse fly is the vector of Trypanosoma brucei in Africa.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q165 (VERIFIED) — Tsetse Fly.

Question 77 Biology

During embryonic development of animals, the nervous system develops from which germ layer?

- A. Endoderm
- B. Mesoderm
- C. Ectoderm ✓ **Predicted answer**
- D. Blastoderm

swer? The ectoderm gives rise to the nervous system and the skin.

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

Question 78 Biology

In flowering plants, the endosperm is formed as a result of:

- A. Double fertilisation ✓ **Predicted answer**
- B. Self-pollination
- C. Parthenocarpy
- D. Single fertilisation

Why this answer? Double fertilisation produces both the zygote and the triploid endosperm.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q167 (VERIFIED) — Double Fertilization.

Question 79 Biology

Which hormone stimulates the secretion of pancreatic juice from the pancreas?

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

Why this answer? Secretin, released by the duodenum, stimulates the pancreas to secrete pancreatic juice.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q169 (VERIFIED) — Secretin.

80 Biology

Antidiuretic hormone (ADH) helps in the reabsorption of water by changing the permeability of the:

- A. Proximal tubule
- B. Loop of Henle
- C. Collecting duct ✓ **Predicted answer**
- D. Glomerulus

Why this answer? ADH increases the water permeability of the collecting duct, so more water is reabsorbed.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q177 (VERIFIED) — Collecting Duct.

Question 81 Biology

Maximum reabsorption of filtrate takes place in which part of the nephron?

- A. Loop of Henle
- B. Distal tubule
- C. Collecting duct
- D. Proximal tubule ✓ **Predicted answer**

Why this answer? Most of the filtrate — water, salts, glucose and amino acids — is reabsorbed in the proximal tubule.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q180 (VERIFIED) — Proximal Tubule.

Question 82 Biology

The respiratory centre, which controls the rate of breathing, is located in the:

- A. Cerebrum

- C. Medulla ✓ **Predicted answer**
- D. Hypothalamus

Why this answer? The respiratory centre lies in the medulla oblongata of the brain stem.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q183 (VERIFIED) — Medulla.

Question 83 Biology

A neurological condition characterised by involuntary tremors, diminished motor activity and rigidity is called:

- A. Alzheimer's disease
- B. Epilepsy
- C. Parkinson's disease ✓ **Predicted answer**
- D. Meningitis

Why this answer? Parkinson's disease is the disorder of tremors, rigidity and slow movement from loss of dopamine neurons.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q184 (VERIFIED) — Parkinson’s Disease.

Question 84 Biology

Which type of cell in the human testes produces testosterone?

- A. Interstitial cells ✓ **Predicted answer**
- B. Germ cells
- C. Spermatogonia
- D. Sertoli cells

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

ed [B] — Verified fact, predicted to recur: 37ahs Q185 (VERIFIED) — Interstitial Cells.

Question 85 Biology

The largest lymph duct, the thoracic duct, drains into the:

- A. Subclavian vein ✓ **Predicted answer**
- B. Hepatic vein
- C. Renal vein
- D. Jugular vein

Why this answer? The thoracic duct empties lymph into the left subclavian vein.

Why predicted [A] — Repeated question: repeated — 37ahs Q173 and 37ahn Q171 and 37m2 Q43 all key Subclavian vein. Also asked as: 37ahs Q173: “The largest lymph duct called thoracic lymph duct drains into”; 37ahn Q171: “The lymphatic vessels of the body empty the lymph into blood stream at the:”; 37m2 Q43: “The thoracic duct drains into the:”

Question 86 Biology

Which of the following is the function of the hormone glucagon?

- A. Glycogen to glucose ✓ **Predicted answer**
- B. Glucose to fat
- C. Protein to glucose
- D. Glucose to glycogen

Why this answer? Glucagon raises blood glucose by breaking down liver glycogen to glucose.

Why predicted [A] — Repeated question: repeated — 37ahs Q205 and 37ahn Q195 all key Glycogen to glucose. Also asked as: 37ahs Q205: “Which of the following is the function of glucagon hormone?”; 37ahn Q195: “Which of the following is the function of glucagon hormone?”

87 Biology

Which vitamin is essential for normal blood clotting?

- A. Vitamin A
- B. Vitamin C
- C. Vitamin D
- D. Vitamin K ✓ **Predicted answer**

Why this answer? Vitamin K is needed to make prothrombin and other clotting factors in the liver.

Why predicted [C] — Syllabus anchor: syllabus anchor — vitamins recur (37ahn Q165: vitamin K is produced by microflora of the large intestine; 37ahs Q170: vitamin K is formed in the large intestine). Standard textbook fact.

Question 88 Biology

The structural and functional unit of the kidney is the:

- A. Nephron ✓ **Predicted answer**
- B. Glomerulus
- C. Ureter
- D. Renal pelvis

Why this answer? The nephron is the kidney's structural and functional unit, filtering blood and forming urine.

Why predicted [C] — Syllabus anchor: syllabus anchor — nephron and kidney function recur (37ahs Q176: reabsorption in the loop of Henle; 37ahs Q180: maximum reabsorption in the proximal tubule). Standard textbook fact.

Question 89 Biology

Which blood cells carry oxygen around the body?

te blood cells

- B. Platelets
- C. Red blood cells ✓ **Predicted answer**
- D. Plasma cells

Why this answer? Red blood cells carry oxygen bound to haemoglobin from the lungs to the tissues.

Why predicted [C] — Syllabus anchor: syllabus anchor — blood cells recur (37ahn Q170: average life span of a red blood cell is about four months; 37ahl Q163: granulocytes are produced in red bone marrow). Standard textbook fact.

Question 90 Biology

In which phase of the cell cycle does DNA replication take place?

- A. S phase ✓ **Predicted answer**
- B. G2 phase
- C. M phase
- D. G1 phase

Why this answer? DNA is replicated during the S (synthesis) phase of interphase, before mitosis.

Why predicted [C] — Syllabus anchor: syllabus anchor — cell division recurs (37ahs Q196: metabolic activity of the nucleus is high in interphase; 37ahl Q184: spindle fibres act during anaphase I). Standard textbook fact.

Question 91 Chemistry

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

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

matic and non-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: 37p Q104 (VERIFIED) — Alicyclic and Aromatic.

Question 92 Chemistry

Q123. Number of unpaired electrons In Boron in ground state is/are:

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

Why this answer? Boron (Z = 5) is $1s^2 2s^2 2p^1$: the single 2p electron is unpaired; correct.

Why predicted [B] — Verified fact, predicted to recur: 37r Q114 (VERIFIED) — 1.

Question 93 Chemistry

Consider the following reaction in equilibrium and tell addition of which chemical will turn the cloudy solution into clear solution? BiCl3 + H2O <-> BiOCl + 2HCl

- A. HCl ✓ **Predicted answer**
- B. BiCl3
- C. H2O
- D. BiOCl

Why this answer? Adding HCl (a product) shifts equilibrium LEFT by Le Chatelier's principle, converting insoluble BiOCl back to soluble $BiCl_3$, clearing the solution; correct.

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

94 Chemistry

Which of the following is NOT a correct feature of electrolytic cells?

- A. Oxidation occurs at anode
- B. Alternating current source is connected to electrodes ✓ **Predicted answer**
- C. Electrochemical reaction takes place
- D. Reduction occurs at cathode

Why this answer? False: electrolytic cells use a DIRECT current source; alternating current would keep reversing polarity and could not drive sustained electrolysis in one direction; correct as the incorrect feature.

Why predicted [B] — Verified fact, predicted to recur: 37p Q92 (VERIFIED) — Alternating current source is connected to electrodes.

Question 95 Chemistry

Q121. In a unit cell of a crystal lattice the angle β is between faces:

- A. not specified
- B. a and b
- C. b and c
- D. c and a ✓ **Predicted answer**

Why this answer? By crystallographic convention β is the interaxial angle between a and c; correct.

Why predicted [B] — Verified fact, predicted to recur: 37r Q113 (VERIFIED) — c and a.

Question 96 Chemistry

Which of the following electronic configuration is correct for carbon?

- A. 1s22s2p2 ✓ **Predicted answer**
- B. 1s22s2p1

- D. 1s22s2p4

Why this answer? Totals 6 electrons (2 + 2 + 2), filling $1s^2$ $2s^2$ $2p^2$, carbon's ground-state configuration; correct.

Why predicted [B] — Verified fact, predicted to recur: 37p Q70 (VERIFIED) — 1s22s2p2.

Question 97 Chemistry

In order to boil water at 110°C, external pressure should be

- A. 200 - 760 torr
- B. 760 - 1200 torr ✓ **Predicted answer**
- C. 665-670 torr
- D. 660-700 torr

Why this answer? Water boils when vapour pressure equals external pressure; at 110 °C the vapour pressure of water is ≈ 1075 torr, inside this range, and above normal atmospheric pressure (760 torr); correct.

Why predicted [B] — Verified fact, predicted to recur: 37p Q74 (VERIFIED) — 760 - 1200 torr.

Question 98 Chemistry

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

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

Why this answer? Benzene + R–X/$AlCl_3$ → alkylbenzene; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q98 (VERIFIED) — Friedel-Crafts alkylation reaction.

Question 99 Chemistry

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

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

Why this answer? Working: 2-propanol (M_r 60) oxidises to acetone/propanone (M_r 58). Moles = 30/60 = 0.50 mol; theoretical acetone = 0.50 × 58 = 29.0 g; at 75% yield = 0.75 × 29.0 ≈ 21.75 g. Correct.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q67 (VERIFIED) — 21.75g.

Question 100 Chemistry

In Friedel Craft acylation an acyl group is introduced in benzene ring in the presence of catalyst:

- A. H2SO4
- B. Sunlight
- C. V2O5
- D. AlCl3 ✓ **Predicted answer**

Why this answer? Anhydrous aluminium chloride, a Lewis acid, generates the acylium ion ($R–C\equiv O^+$) from the acyl chloride; the standard Friedel–Crafts acylation catalyst; correct.

Why predicted [B] — Verified fact, predicted to recur: 37p Q107 (VERIFIED) — AlCl3.

101 Chemistry

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

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

Why this answer? An amount of substance; it is not a property affected by force strength; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q75 (VERIFIED) — moles.

Question 102 Chemistry

One mole of carbon dioxide (CO_2) contains how many molecules?

- A. 6.02×10^{22}
- B. 3.01×10^{23}
- C. 6.02×10^{23} ✓ **Predicted answer**
- D. 1.20×10^{24}

Why this answer? One mole of any substance contains Avogadro's number of particles, 6.02×10^{23} — so one mole of CO_2 contains 6.02×10^{23} molecules.

Why predicted [C] — Syllabus anchor: syllabus anchor — Avogadro/mole recur (37za Q91: Avogadro's law volume). Standard textbook fact.

Question 103 Chemistry

In the electrochemical series, standard electrode potentials are arranged on the basis of the:

gen scale

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

Why this answer? Standard electrode potentials are measured against the standard hydrogen electrode.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q61 (VERIFIED) — Hydrogen Scale.

Question 104 Chemistry

The reaction responsible for the production of electricity in a voltaic cell is a:

- A. Neutralisation reaction
- B. Redox reaction ✓ **Predicted answer**
- C. Hydrolysis reaction
- D. Precipitation reaction

Why this answer? A voltaic cell produces electricity from a spontaneous redox (oxidation-reduction) reaction.

Why predicted [A] — Repeated question: repeated — 37ahl Q62 and 37m2 Q87 all key Redox reaction. Also asked as: 37ahl Q62: “The reaction which is responsible for the production of electricity in the Voltaic cell is:”; 37m2 Q87: “The reaction responsible for electricity production in a voltaic cell is:”

Question 105 Chemistry

Glucose is converted into ethanol by the enzyme present in yeast:

- A. Diastase
- B. Zymase ✓ **Predicted answer**
- C. Invertase

Why this answer? Zymase, the enzyme complex in yeast, ferments glucose to ethanol and carbon dioxide.

Why predicted [A] — Repeated question: repeated — 37ahl Q63 and 37ahs Q81 all key Zymase. Also asked as: 37ahl Q63: “Glucose is converted into ethanol by the enzyme _____ present in yeast:”; 37ahs Q81: “Glucose is converted into ethanol by the enzyme present in yeast:”

Question 106 Chemistry

The rate of a reaction involving ions can be studied by the _____ method.

- A. Electrical conductivity ✓ **Predicted answer**
- B. Colorimetry
- C. Polarimetry
- D. Refractometry

Why this answer? Ionic reactions change the ion concentration, which is followed by measuring electrical conductivity.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q64 (VERIFIED) — Electrical conductivity.

Question 107 Chemistry

The energy required to remove an electron from the outermost shell of an isolated gaseous atom in its ground state is the:

- A. Electron affinity
- B. Ionisation energy ✓ **Predicted answer**
- C. Electronegativity
- D. Lattice energy

Why this answer? Ionisation energy is defined as the energy needed to remove the outermost electron from a gaseous atom.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q66 (VERIFIED) — Ionization energy.

Question 108 Chemistry

Which carbonate of the alkali metals is NOT stable towards heat and decomposes on heating?

- A. Sodium carbonate
- B. Potassium carbonate
- C. Lithium carbonate ✓ **Predicted answer**
- D. Rubidium carbonate

Why this answer? Li2CO3 is the only alkali-metal carbonate that decomposes on heating, because Li+ strongly polarises the carbonate ion.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q67 (VERIFIED) — Li2CO3.

Question 109 Chemistry

Which of the following sulphates is NOT soluble in water?

- A. Magnesium sulphate
- B. Sodium sulphate
- C. Barium sulphate ✓ **Predicted answer**
- D. Zinc sulphate

Why this answer? Barium sulphate is insoluble in water, unlike the other sulphates listed.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q69 (VERIFIED) — Barium Sulphate.

110 Chemistry

The strongest acid among the following is:

- A. Hydrofluoric acid
- B. Hydrochloric acid
- C. Hydrobromic acid
- D. Hydroiodic acid ✓ **Predicted answer**

Why this answer? Among the hydrogen halides, acid strength increases down the group: HI is the strongest.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q72 (VERIFIED) — HI.

Question 111 Chemistry

The noble gas used in the radiotherapy of cancer is:

- A. Argon
- B. Radon ✓ **Predicted answer**
- C. Neon
- D. Xenon

Why this answer? Radon (as radon seeds) has been used in radiotherapy of cancer.

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

Question 112 Chemistry

The paramagnetic behaviour of an atom, ion or molecule is due to the presence of:

- A. Paired electrons
- B. Unpaired electrons ✓ **Predicted answer**
- C. Protons
- D. Neutrons

swer? Unpaired electrons give a substance a net magnetic moment, making it paramagnetic.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q74 (VERIFIED) — Unpaired electrons.

Question 113 Chemistry

Potassium permanganate (KMnO4) acts as a:

- A. Reducing agent
- B. Oxidising agent ✓ **Predicted answer**
- C. Catalyst
- D. Dehydrating agent

Why this answer? KMnO4 is a strong oxidising agent in acidic, neutral and alkaline media.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q76 (VERIFIED) — Oxidizing agent.

Question 114 Chemistry

Gasoline of higher octane number can be obtained by:

- A. Fractional distillation
- B. Catalytic cracking ✓ **Predicted answer**
- C. Polymerisation
- D. Hydrogenation

Why this answer? Catalytic cracking breaks large hydrocarbons into branched, high-octane fractions.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q77 (VERIFIED) — Catalytic cracking.

115 Chemistry

In ethyne, the two carbon atoms form a sigma bond by:

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

Why this answer? The carbons in ethyne are sp-hybridised, so the C–C sigma bond is an sp-sp overlap.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q78 (VERIFIED) — sp-sp overlap.

Question 116 Chemistry

Symmetrical alkanes can be produced by:

- A. Wurtz reaction
- B. Kolbe's electrolytic reaction ✓ **Predicted answer**
- C. Friedel-Crafts reaction
- D. Clemmensen reduction

Why this answer? Electrolysis of a carboxylate salt (Kolbe's reaction) couples two alkyl groups into a symmetrical alkane.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q79 (VERIFIED) — Kolbe’s Electrolytic Reaction.

Question 117 Chemistry

When a hydrogen atom is removed from benzene, the group left behind is called the:

- A. Benzyl group
- B. Phenyl group ✓ **Predicted answer**

- D. Styryl group

Why this answer? Removing one H from benzene leaves the C6H5– phenyl group.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q81 (VERIFIED) — Phenyl group.

Question 118 Chemistry

The nitration of benzene takes place with:

- A. Concentrated nitric acid only
- B. Concentrated sulphuric acid only
- C. Concentrated nitric acid and concentrated sulphuric acid ✓ **Predicted answer**
- D. Dilute nitric acid and dilute sulphuric acid

Why this answer? The mixed acid generates the nitronium ion that nitrates benzene.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q82 (VERIFIED) — Conc. HNO3 and conc. H2SO4.

Question 119 Chemistry

During SN2 reactions, the configuration of the alkyl halide molecule:

- A. Remains unchanged
- B. Gets inverted ✓ **Predicted answer**
- C. Becomes planar
- D. Is lost completely

Why this answer? SN2 attack from the back inverts the configuration at the carbon (Walden inversion).

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q83 (VERIFIED) — Gets inverted.

120 Chemistry

Grignard reagents are prepared by the reaction of magnesium metal with alkyl halides in the presence of:

- A. Water
- B. Dry ether ✓ **Predicted answer**
- C. Alcohol
- D. Aqueous sodium hydroxide

Why this answer? Grignard reagents form in dry ether, which solvates the reagent; water would destroy it.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q84 (VERIFIED) — Dry Ether.

Question 121 Chemistry

Methanol is prepared from carbon monoxide and hydrogen using the catalyst:

- A. Iron(III) oxide
- B. Cr_2O_3 + ZnO ✓ **Predicted answer**
- C. Nickel
- D. Platinum

Why this answer? The industrial synthesis of methanol from CO and H_2 uses a Cr_2O_3/ZnO catalyst.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q85 (VERIFIED) — Cr_2O_3 + ZnO.

Question 122 Chemistry

Brick-red precipitates are formed when aldehydes react with:

- A. Tollen's reagent

ling's solution ✓ **Predicted answer**

- C. Schiff's reagent
- D. Bromine water

Why this answer? Aldehydes reduce Fehling's solution to brick-red cuprous oxide; Tollen's reagent gives a silver mirror instead.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q90 (VERIFIED) — Fehling’s solution.

Question 123 Chemistry

Ethanol reacts with ammonia to produce ethylamine. The catalyst used is:

- A. Nickel
- B. ThO2 ✓ **Predicted answer**
- C. Platinum
- D. Iron

Why this answer? Ethanol reacts with ammonia over thoria (ThO2) to give ethylamine.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q86 (VERIFIED) — ThO2.

Question 124 Chemistry

Dry distillation of a mixture of calcium salts of formic acid and acetic acid results in the formation of:

- A. Formaldehyde
- B. Acetaldehyde ✓ **Predicted answer**
- C. Acetone
- D. Propanal

Why this answer? Calcium formate plus calcium acetate on dry distillation gives acetaldehyde.

ed [B] — Verified fact, predicted to recur: 37ahl Q88 (VERIFIED) — Acetaldehyde.

Question 125 Chemistry

Hydrolysis of a cyano group by an aqueous acid results in:

- A. An alcohol
- B. An aldehyde
- C. A carboxylic acid ✓ **Predicted answer**
- D. An amine

Why this answer? Acid hydrolysis of a nitrile (cyano group) gives a carboxylic acid.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q89 (VERIFIED) — Carboxylic Acid.

Question 126 Chemistry

The amino acid lysine is _____ in nature.

- A. Acidic
- B. Basic ✓ **Predicted answer**
- C. Neutral
- D. Amphoteric

Why this answer? Lysine carries an extra amino group on its side chain, so it is a basic amino acid.

Why predicted [A] — Repeated question: repeated — 37ahl Q91 and 37ahn Q69 all key Basic. Also asked as: 37ahl Q91: “The nature of the amino acid ‘lysine’ is”; 37ahn Q69: “The nature of the amino acid lysine is:”

127 Chemistry

One mole of any gas at standard temperature and pressure (STP) occupies a volume of:

- A. 11.2 dm3
- B. 22.414 dm3 ✓ **Predicted answer**
- C. 24.0 dm3
- D. 44.8 dm3

Why this answer? At STP one mole of an ideal gas occupies 22.414 dm3.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q98 (VERIFIED) — 22.414 dm3.

Question 128 Chemistry

The relative abundance of the isotopes of an element can be determined by:

- A. Mass spectrometry ✓ **Predicted answer**
- B. Chromatography
- C. Crystallography
- D. Titration

Why this answer? A mass spectrometer separates isotopes by mass and measures their relative abundances.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q99 (VERIFIED) — Mass Spectrometry.

Question 129 Chemistry

Sublimation is used to purify:

- A. Sodium chloride
- B. Benzoic acid ✓ **Predicted answer**
- C. Copper sulphate

Why this answer? Benzoic acid sublimes on heating, so sublimation purifies it from non-volatile impurities.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q101 (VERIFIED) — Benzoic acid.

Question 130 Chemistry

The purity of a substance can be identified by:

- A. Filtration
- B. Chromatography ✓ **Predicted answer**
- C. Distillation
- D. Decantation

Why this answer? Chromatography separates a mixture into its components, revealing impurities and checking purity.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q102 (VERIFIED) — Chromatography.

Question 131 Chemistry

The root mean square velocity of a gas is inversely proportional to the square root of its:

- A. Temperature
- B. Pressure
- C. Molar mass ✓ **Predicted answer**
- D. Volume

Why this answer? Vrms = sqrt(3RT/M): it falls as the square root of the molar mass rises.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q104 (VERIFIED) — Molar mass.

132 Chemistry

Which type of force is present in gasoline, a non-polar hydrocarbon mixture?

- A. Hydrogen bonding
- B. London dispersion forces ✓ **Predicted answer**
- C. Dipole-dipole forces
- D. Ionic forces

Why this answer? Non-polar hydrocarbons are held together by London dispersion forces.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q106 (VERIFIED) — London dispersion forces.

Question 133 Chemistry

In the structure of NaCl, each Na+ ion is surrounded by how many Cl- ions?

- A. Four
- B. Eight
- C. Six ✓ **Predicted answer**
- D. Twelve

Why this answer? In the NaCl lattice each Na+ is octahedrally surrounded by six Cl- ions.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q107 (VERIFIED) — Six.

Question 134 Chemistry

Which quantum number helps to study the orientation of an orbital in space?

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

swer? The magnetic quantum number (m) gives the orientation of an orbital in space.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q110 (VERIFIED) — Magnetic Quantum Number.

Question 135 Chemistry

Which one of the following molecules has zero dipole moment?

- A. H2O
- B. NH3
- C. BF3 ✓ **Predicted answer**
- D. HCl

Why this answer? BF3 is trigonal planar and symmetrical, so its bond dipoles cancel and the dipole moment is zero.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q113 (VERIFIED) — BF3.

Question 136 Chemistry

The equilibrium constant Kc for the reaction H2(g) + I2(g) ⇌ 2HI(g) has which units?

- A. mol dm-3
- B. dm3 mol-1
- C. No unit ✓ **Predicted answer**
- D. mol2 dm-6

Why this answer? The numbers of moles are equal on both sides, so the concentration units cancel and Kc has no unit.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q116 (VERIFIED) — No unit.

137 Chemistry

Metallic conduction involves the relatively free movement of which particles throughout the metallic lattice?

- A. Atoms
- B. Molecules
- C. Electrons ✓ **Predicted answer**
- D. Ions

Why this answer? Metals conduct because their valence electrons move freely through the lattice.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q120 (VERIFIED) — Electrons.

Question 138 Chemistry

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

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

Why this answer? Electric charge is measured in coulombs; the volt measures potential difference and the ampere measures current.

Why predicted [C] — Syllabus anchor: syllabus anchor — charge and electrical units recur (37ahl Q108: charge of one gram of electrons; 37p Q144: SI unit of capacitance is the farad). Standard textbook fact.

Question 139 Chemistry

What is the pH of a neutral solution at 25 °C?

- B. 7 ✓ **Predicted answer**
- C. 14
- D. 1

Why this answer? A neutral solution at 25 °C has equal H+ and OH- concentrations, giving pH 7.

Why predicted [C] — Syllabus anchor: syllabus anchor — acids, pH and ionic equilibria recur (37ahl Q72: strongest acid is HI; 37ahl Q117: percentage ionisation of acetic acid). Standard textbook fact.

Question 140 Chemistry

Which gas is released when dilute hydrochloric acid reacts with zinc metal?

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

Why this answer? Metals above hydrogen in the reactivity series displace hydrogen from dilute acids: Zn + 2HCl → ZnCl2 + H2.

Why predicted [C] — Syllabus anchor: syllabus anchor — chemical reactions and reactivity recur (37ahl Q62: redox reaction in the voltaic cell; 37ahl Q76: KMnO4 as an oxidising agent). Standard textbook fact.

Question 141 Physics

The SI unit of capacitance is:

- A. Watts
- B. Henry
- C. Farad ✓ **Predicted answer**

Why this answer? correct: the SI unit of capacitance is the farad.

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

Question 142 Physics

Q133. An angular displacement of 90° is equal to:

- A. One half revolution
- B. One complete revolution
- C. One-fourth revolution ✓ **Predicted answer**
- D. One- third revolution

Why this answer? 90°/360° = 1/4 of a full turn; correct.

Why predicted [B] — Verified fact, predicted to recur: 37r Q124 (VERIFIED) — One-fourth revolution.

Question 143 Physics

The formula V = W / qo represents

- A. Electric field gradient
- B. Electric intensity
- C. Electric power
- D. Electric potential ✓ **Predicted answer**

Why this answer? Potential V is the work done per unit positive charge in bringing a test charge from infinity to the point, $V = W/q_0$; correct.

Why predicted [B] — Verified fact, predicted to recur: 37p Q143 (VERIFIED) — Electric potential.

144 Physics

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

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

Why this answer? Magnetic force acts perpendicular to velocity, curving the path at constant speed; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q152 (VERIFIED) — Only direction.

Question 145 Physics

A bullet fired from gun pierces a target due to:

- A. Heat energy
- B. Kinetic energy ✓ **Predicted answer**
- C. Potential energy
- D. Mechanical energy

Why this answer? correct: a fired bullet moves at high speed, and its kinetic energy ($\frac{1}{2}mv^2$) does the work of piercing the target.

Why predicted [B] — Verified fact, predicted to recur: 37za Q157 (VERIFIED) — Kinetic energy.

Question 146 Physics

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

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

he potential energy of the most energetic electron ejected

- C. c. The photon energy
- D. d. The electric potential that causes the electron current to vanish ✓ **Predicted answer**

Why this answer? The retarding potential that just stops the photocurrent; correct (eV_0 = K_max).

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q163 (VERIFIED) — d. The electric potential that causes the electron current to vanish.

Question 147 Physics

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

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

Why this answer? Photon absorption ejects electrons from a surface; correct.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q162 (VERIFIED) — b. Photoelectric effect.

Question 148 Physics

The distance between two successive particles which are exactly in the same state of vibration is called

- A. Frequency
- B. Amplitude
- C. Wavelength ✓ **Predicted answer**
- D. Time period

swer? The distance between two successive particles in exactly the same phase of vibration (e.g. crest to crest) IS the wavelength; correct.

Why predicted [B] — Verified fact, predicted to recur: 37p Q139 (VERIFIED) — Wavelength.

Question 149 Physics

Q132. In an ideal transformer, if the primary voltage is doubled and the turns ratio remains the same, what happens to the secondary current?

- A. Doubles ✓ **Predicted answer**
- B. Halves
- C. Remains the same
- D. Becomes four times

Why this answer? With fixed turns ratio the secondary voltage doubles; for a fixed load impedance the secondary current (V/R) doubles; correct under that fixed-load reading.

Why predicted [B] — Verified fact, predicted to recur: 37r Q123 (VERIFIED) — Doubles.

Question 150 Physics

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

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

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

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q148 (VERIFIED) — mass.

151 Physics

Q127. If P is the momentum of an object and m is its mass, then its kinetic energy is:

- A. P^2/2m ✓ **Predicted answer**
- B. 1/2 Pm^2
- C. 1/2 P^2/m^2
- D. P/2m

Why this answer? From KE = ½mv² and p = mv: KE = p²/2m; correct.

Why predicted [B] — Verified fact, predicted to recur: 37r Q118 (VERIFIED) — P^2/2m.

Question 152 Physics

For a projectile, the angle of projection for maximum horizontal range is:

- A. 30^0
- B. 45^0 ✓ **Predicted answer**
- C. 60^0
- D. 22.5^0

Why this answer? correct: range R = v²sin2θ/g is maximum when sin2θ = 1, i.e. 2θ = 90°, so θ = 45°.

Why predicted [B] — Verified fact, predicted to recur: 37za Q127 (VERIFIED) — 45^0.

Question 153 Physics

Potential difference is measured in:

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

swer? Potential difference (voltage) is measured in volts; current is measured in amperes, resistance in ohms and power in watts.

Why predicted [C] — Syllabus anchor: syllabus anchor — potential difference recurs (37za Q144: potential difference). Standard textbook fact.

Question 154 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 (37za Q127: projectile maximum range). Standard textbook fact.

Question 155 Physics

Which one is the highest power multiple?

- A. Giga
- B. Tera ✓ **Predicted answer**
- C. Mega
- D. Deca

Why this answer? Tera (10^12) is larger than giga (10^9) and mega (10^6).

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q1 (VERIFIED) — Tera.

156 Physics

The electrical analogue of mass is:

- A. Capacitance
- B. Resistance
- C. Inductance ✓ **Predicted answer**
- D. Conductance

Why this answer? Inductance opposes changes in current, just as mass (inertia) opposes changes in motion.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q3 (VERIFIED) — Inductance.

Question 157 Physics

In a cathode ray oscilloscope, the grid:

- A. Focuses the beam
- B. Controls the brightness of the spot formed ✓ **Predicted answer**
- C. Deflects the beam
- D. Accelerates the electrons

Why this answer? The grid controls the number of electrons reaching the screen, hence the spot brightness.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q7 (VERIFIED) — Controls the brightness of spot formed.

Question 158 Physics

If the velocity of a body is doubled, its momentum and kinetic energy change as:

- A. Momentum doubles and kinetic energy doubles
- B. Momentum doubles and kinetic energy becomes four times ✓ **Predicted answer**

momentum becomes four times and kinetic energy doubles

- D. Both become four times

Why this answer? Momentum is proportional to v, while kinetic energy is proportional to v squared.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q9 (VERIFIED) — Momentum increases 2 times and K.E increases 4 times.

Question 159 Physics

The energy consumed by a 60-watt bulb in 2 seconds is:

- A. 30 J
- B. 60 J
- C. 120 J ✓ **Predicted answer**
- D. 240 J

Why this answer? Energy = power × time = 60 W × 2 s = 120 J.

Why predicted [A] — Repeated question: repeated — 37ahl Q10 and 37m2 Q124 all key 120 J. Also asked as: 37ahl Q10: “The consumption of energy by 60-watt bulb in 2 seconds is:”; 37m2 Q124: “The consumption of energy by a 60 W bulb in 2 s is:”

Question 160 Physics

In a transistor, the base region is very thin, of the order of:

- A. 10^-3 m
- B. 10^-4 m
- C. 10^-6 m ✓ **Predicted answer**
- D. 10^-9 m

Why this answer? The transistor base is a very thin layer, about a micrometre thick.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q11 (VERIFIED) — 10^-6 m.

161 Physics

The closed-loop gain of an OP-AMP depends on:

- A. The open-loop gain only
- B. The supply voltage
- C. Externally connected resistances ✓ **Predicted answer**
- D. The input frequency only

Why this answer? The closed-loop gain is set by the external feedback resistors.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q12 (VERIFIED) — Externally connected resistances.

Question 162 Physics

The value of Wien's constant is:

- A. 2.90 x 10^-3 mK ✓ **Predicted answer**
- B. 6.63 x 10^-34 Js
- C. 1.38 x 10^-23 JK-1
- D. 3.00 x 10^8 ms-1

Why this answer? Wien's displacement constant is 2.90 × 10^-3 m·K.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q14 (VERIFIED) — 2.90 x 10^-3 mK.

Question 163 Physics

The minimum frequency below which no electron is emitted from a metal surface is called the:

- A. Cut-off frequency
- B. Threshold frequency ✓ **Predicted answer**
- C. Resonant frequency

Why this answer? Below the threshold frequency, photons lack the energy to eject electrons, however intense the light.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q15 (VERIFIED) — Threshold frequency.

Question 164 Physics

In pair production, the type of photon used is:

- A. X-rays
- B. Ultraviolet light
- C. γ-radiations ✓ **Predicted answer**
- D. Infrared light

Why this answer? Pair production needs a high-energy gamma photon (at least 1.02 MeV) near a nucleus.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q16 (VERIFIED) — γ-radiations.

Question 165 Physics

The velocity of an electron moving in the first orbit of hydrogen is:

- A. 2.19 × 10^6 m/sec ✓ **Predicted answer**
- B. 1.10 × 10^6 m/sec
- C. 3.00 × 10^8 m/sec
- D. 2.19 × 10^5 m/sec

Why this answer? In the Bohr model the ground-state electron speed is about 2.19 × 10^6 m/s.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q18 (VERIFIED) — 2.19 ×

Question 166 Physics

The SI unit of absorbed dose is the gray, and one gray is equal to:

- A. 1 J
- B. 1 J/kg ✓ **Predicted answer**
- C. 1 kg/J
- D. 1 W/kg

Why this answer? One gray (Gy) is one joule of radiation energy absorbed per kilogram of matter.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q22 (VERIFIED) — J / kg.

Question 167 Physics

The principle of homogeneity of dimensions determines the:

- A. Magnitude of a quantity
- B. Correctness of an equation ✓ **Predicted answer**
- C. Unit of a quantity
- D. Direction of a vector

Why this answer? If the dimensions on both sides of an equation do not match, the equation cannot be correct.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q23 (VERIFIED) — Correctness of an equation.

Question 168 Physics

For a body to be in complete equilibrium:

- A. Linear acceleration should be zero only

ular acceleration should be zero only

- C. Linear acceleration and angular acceleration both should be zero ✓ **Predicted answer**
- D. Velocity should be zero

Why this answer? Complete equilibrium needs zero net force and zero net torque.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q24 (VERIFIED) — Linear acceleration and angular acceleration both should be zero.

Question 169 Physics

A force of magnitude 8 N acts on a body in a direction making an angle of 30° with the x-axis. Its x and y components are:

- A. Fx = 4 N and Fy = 4√3 N
- B. Fx = 4√3 N and Fy = 4 N ✓ **Predicted answer**
- C. Fx = 8 N and Fy = 0 N
- D. Fx = 4 N and Fy = 8 N

Why this answer? Fx = 8 cos 30° = 4√3 N and Fy = 8 sin 30° = 4 N.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q26 (VERIFIED) — Fx = 4√3 and Fy = 4.

Question 170 Physics

If the velocity of a body changes by an equal amount in equal intervals of time, the body is said to have:

- A. Uniform velocity
- B. Uniform acceleration ✓ **Predicted answer**
- C. Variable acceleration
- D. Zero acceleration

swer? Equal changes of velocity in equal times define uniform (constant) acceleration.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q29 (VERIFIED) — uniform acceleration.

Question 171 Physics

Which one of the following is a non-conservative force?

- A. Gravitational force
- B. Frictional force ✓ **Predicted answer**
- C. Electrostatic force
- D. Spring force

Why this answer? Friction dissipates mechanical energy as heat, so it is non-conservative; gravity, electrostatic and spring forces conserve mechanical energy.

Why predicted [A] — Repeated question: repeated — 37ahl Q32 and 37p Q124 all key Frictional force. Also asked as: 37ahl Q32: “Which one of the following is a non-conservative force?”; 37p Q124: “Which of the following is a non-conservative force?”

Question 172 Physics

The value of escape velocity for the surface of the Earth is 11 km/s. Its value for the surface of the Moon is about:

- A. 11 km/s
- B. 2.4 km/s ✓ **Predicted answer**
- C. 5.5 km/s
- D. 22 km/s

Why this answer? The Moon's smaller mass and radius give a much lower escape velocity, about 2.4 km/s.

ed [B] — Verified fact, predicted to recur: 37ahl Q33 (VERIFIED) — 2.4 km/sec.

Question 173 Physics

When a lift is accelerated upward, the apparent weight of an object in it will be:

- A. Less than its real weight
- B. Greater than its real weight ✓ **Predicted answer**
- C. Equal to its real weight
- D. Zero

Why this answer? Upward acceleration adds to gravity, so the floor pushes harder and the apparent weight rises.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q35 (VERIFIED) — Greater than its real weight.

Question 174 Physics

Conservation of mass of fluid flow leads to the:

- A. Bernoulli equation
- B. Equation of continuity ✓ **Predicted answer**
- C. Torricelli theorem
- D. Stokes law

Why this answer? Mass conservation for a flowing fluid gives the continuity equation (A·v = constant).

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q38 (VERIFIED) — Equation of continuity.

175 Physics

An oscillating body is at its mean position at t = 0. At t = T/4 it will be at the:

- A. Mean position
- B. Extreme position ✓ **Predicted answer**
- C. Half-way point
- D. Rest position

Why this answer? Starting from the mean position, a simple harmonic oscillator reaches an extreme after a quarter period.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q40 (VERIFIED) — Extreme position.

Question 176 Physics

In a simple pendulum, the tension of the string is:

- A. mg
- B. mg sin θ
- C. mg cos θ ✓ **Predicted answer**
- D. mg tan θ

Why this answer? The tension balances the radial component of the weight, mg cos θ, at displacement θ.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q41 (VERIFIED) — mg cos θ.

Question 177 Physics

Which quantity can be measured by using the base unit $kg \cdot m^2 \cdot s^{-3}$?

- A. Weight
- B. Pressure
- C. Power ✓ **Predicted answer**

Why this answer? Power is energy per unit time: joule per second = $kg \cdot m^2 \cdot s^{-3}$.

Why predicted [A] — Repeated question: repeated — 37ahn Q2 and 37p Q150 and 37za Q155 all key Power. Also asked as: 37ahn Q2: “Name the quantity which can be measured by using base unit ‘kgm2s-3’”; 37p Q150: “Volt x Ampere is the measure of;”; 37za Q155: “The quantity that remains constant in an ideal transformer is:”

Question 178 Physics

The value of the universal gas constant is:

- A. 8.314 Jmol-1K-1 ✓ **Predicted answer**
- B. 6.02 x 10^23 mol-1
- C. 1.38 x 10^-23 JK-1
- D. 9.81 ms-2

Why this answer? The universal gas constant R is 8.314 $J \cdot mol^{-1} \cdot K^{-1}$.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q49 (VERIFIED) — 8.314 Jmol-1K-1.

Question 179 Physics

What is the SI unit of force?

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

Why this answer? Force is measured in newtons ($kg \cdot m \cdot s^{-2}$).

Why predicted [C] — Syllabus anchor: syllabus anchor — SI units recur (37ahl Q2: SI unit of charge is the coulomb; 37ahl Q49: universal gas constant is 8.314 Jmol-1K-1). Standard

Question 180 Physics

A body moves with uniform velocity. Its acceleration is:

- A. Increasing
- B. Decreasing
- C. Zero ✓ **Predicted answer**
- D. Equal to its velocity

Why this answer? Uniform velocity means no change of velocity, so acceleration is zero.

Why predicted [C] — Syllabus anchor: syllabus anchor — motion and acceleration recur (37ahl Q29: velocity changing equally in equal times is uniform acceleration; 37ahs Q5: a droplet falls with constant speed when drag equals weight). Standard textbook fact.

Question 181 English

Choose the sentence that is grammatically correct.

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

Why this answer? "Boring" describes the play (causing boredom); "bored" describes people's feeling; correct pairing.

Why predicted [B] — Verified fact, predicted to recur: 37m2 Q181 (VERIFIED) — We agreed that the play was rather boring so we felt bored.

Question 182 English

Choose the synonym of CAPTIVATE.

- B. Hesitate
- C. Concentrate
- D. Hate

Why this answer? To captivate is to fascinate or charm someone completely.

Why predicted [A] — Repeated question: repeated — 37ahl Q150 and 37ahn Q130 all key Fascinate. Also asked as: 37ahl Q150: “CAPTIVATE”; 37ahn Q130: “CAPTIVATE”

Question 183 English

Choose the synonym of WALLOW.

- A. Roll about ✓ **Predicted answer**
- B. Sleep soundly
- C. Run fast
- D. Hide away

Why this answer? To wallow is to roll about in mud or water, as pigs do.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q141 (VERIFIED) — Roll about.

Question 184 English

Choose the synonym of ECCENTRIC.

- A. Ordinary
- B. Odd ✓ **Predicted answer**
- C. Generous
- D. Clever

Why this answer? Eccentric means odd or unconventional in behaviour.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q143 (VERIFIED) — Odd

185 English

Choose the synonym of SLUMBER.

- A. Sleep ✓ **Predicted answer**
- B. Dream
- C. Wake
- D. Shout

Why this answer? Slumber is a literary word for sleep.

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

Question 186 English

Choose the synonym of FELICITY.

- A. Sadness
- B. Anger
- C. Intense happiness ✓ **Predicted answer**
- D. Fear

Why this answer? Felicity means intense happiness or bliss.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q148 (VERIFIED) — Intense Happiness.

Question 187 English

Choose the synonym of MUSE.

- A. Sing
- B. Ponder ✓ **Predicted answer**
- C. Dance
- D. Forget

swer? To muse is to ponder or think deeply about something.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q123 (VERIFIED) — Ponder.

Question 188 English

Choose the synonym of FECKLESS.

- A. Careful
- B. Useless ✓ **Predicted answer**
- C. Brave
- D. Honest

Why this answer? Feckless means lacking purpose or effectiveness — useless.

Why predicted [B] — Verified fact, predicted to recur: 37ahs Q124 (VERIFIED) — Useless.

Question 189 English

My advice had no _____ on him.

- A. Affect
- B. Effect ✓ **Predicted answer**
- C. Effort
- D. Affection

Why this answer? "Effect" is the noun (a result); "affect" is the verb, so "no effect on him" is correct.

Why predicted [B] — Verified fact, predicted to recur: 37ahl Q121 (VERIFIED) — Effect.

Question 190 English

Choose the synonym of TRANSPARENT.

- B. Clear ✓ **Predicted answer**
- C. Coloured
- D. Thick

Why this answer? Transparent means clear — letting light through so objects can be seen.

Why predicted [C] — Syllabus anchor: syllabus anchor — vocabulary and synonym items recur (37ahl Q150: captivate means fascinate; 37ahs Q123: muse means ponder). Standard fact.

Question 191 Logical Reasoning

All daffodils are plants. All plants are living things. Some living things are real. Conclusions: I. All daffodils are living things. II. Some living things are flowers. III. All daffodils are real. Which conclusions follow?

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

Why this answer? Conclusion I follows by transitivity: daffodils ⊆ plants ⊆ living things; correct under the convention used.

Why predicted [B] — Verified fact, predicted to recur: 37r Q161 (VERIFIED) — Only I.

Question 192 Logical Reasoning

X's son is cousin of Y's son. If Y has no brother what is X to Y?

- A. Sister ✓ **Predicted answer**
- B. Cousin
- C. Nephew

Why this answer? correct: X's son and Y's son are cousins, so X and Y are siblings; Y has no brother, so X (the sibling) must be Y's sister.

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

Question 193 Logical Reasoning

One apple pie has 10 slices, and each apple pie feeds five people. Henry is having a party with 200 people. How many slices of pie does he need?

- A. 100
- B. 200
- C. 50
- D. 400 ✓ **Predicted answer**

Why this answer? 200 people ÷ 5 per pie = 40 pies; 40 × 10 slices = 400 slices; correct.

Why predicted [B] — Verified fact, predicted to recur: 37r Q162 (VERIFIED) — 400.

Question 194 Logical Reasoning

Find the next number in the series: 6, 11, 18, 27, 38, ...?

- A. 49
- B. 50
- C. 51 ✓ **Predicted answer**
- D. 53

Why this answer? The differences are +5, +7, +9, +11, so the next difference is +13; 38 + 13 = 51.

Why predicted [C] — Syllabus anchor: syllabus anchor — number series recur (37za Q174: number series 48, 45, 40, 33, 24...). New series, worked answer.

195 Logical Reasoning

What number comes next in the series: 48, 45, 40, 33, 24, ...?

- A. 15
- B. 13 ✓ **Predicted answer**
- C. 11
- D. 9

Why this answer? The differences are −3, −5, −7, −9, so the next difference is −11; 24 − 11 = 13.

Why predicted [B] — Verified fact, predicted to recur: 37za Q174 (VERIFIED) — 13.

Question 196 Logical Reasoning

What will come next? 1, 4, 2, 5, 3, 6, 4, 7, ?

- A. 8
- B. 5 ✓ **Predicted answer**
- C. 6
- D. 9

Why this answer? The series alternates two sequences: 1, 2, 3, 4, ... and 4, 5, 6, 7, ...; the next term of the first sequence is 5.

Why predicted [B] — Verified fact, predicted to recur: 37r Q166 (VERIFIED) — 5.

Question 197 Logical Reasoning

All roses are flowers. All flowers are plants. Some plants are red. Conclusions: I. All roses are plants. II. All roses are red. Which conclusion follows?

- A. Only I ✓ **Predicted answer**
- B. Only II
- C. Both I and II

Why this answer? All roses are flowers and all flowers are plants, so all roses are plants; nothing says all roses are red.

Why predicted [B] — Verified fact, predicted to recur: 37r Q167 (VERIFIED) — Only I.

Question 198 Logical Reasoning

P and Q are M's parents. M and N are siblings. Q is N's mother. What is P to M?

- A. Mother
- B. Uncle
- C. Father ✓ **Predicted answer**
- D. Brother

Why this answer? P and Q are the two parents; Q is the mother, so P is the father.

Why predicted [B] — Verified fact, predicted to recur: 37r Q170 (VERIFIED) — Father.

Question 199 Logical Reasoning

X's son is the cousin of Y's son. If Y has no brother, what is X to Y?

- A. Brother
- B. Sister ✓ **Predicted answer**
- C. Mother
- D. Cousin

Why this answer? X's son and Y's son are cousins, so X and Y are siblings; Y has no brother, so X is Y's sister.

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

200 Logical Reasoning

What percentage of 90 minutes is 54 seconds?

- A. One percent ✓ **Predicted answer**
- B. Ten percent
- C. Six percent
- D. Sixty percent

Why this answer? 90 minutes is 5,400 seconds; 54 is 1% of 5,400.

Why predicted [B] — Verified fact, predicted to recur: 37za Q172 (VERIFIED) — One percent.

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