KRISH RAUNIYAR • 2026 CEE STUDENT EDITION

CEE MCQs & SURE SHOTS

THE PYQ-ANALYSIS INTENSIVE

500 CEE-style MCQs • 5 complete 100-question analysis papers

MBBS / BDS / BSc NURSING

PHYSICS	125 questions
CHEMISTRY	125 questions
BOTANY	100 questions
ZOOLOGY	100 questions
MENTAL AGILITY	50 questions

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Source transparency & PYQ analysis

The uploaded reference collection contains annual memory-based PDFs labelled 2021–2025, a 2026 model set, and one independent 180-MCQ advanced mock. These are not seven verified official examination papers.

YEAR • MEMORY-BASED PYQ Question drawn or carefully reformulated from the corresponding uploaded year-labelled memory-based reconstruction. Wording and answers are not certified by MEC.

YEAR • ADAPTED An imperfect, ambiguous, or figure-dependent PYQ has been rephrased into a single-best-answer practice item. Its subject theme is traceable to the named source.

2026 • MODEL PAPER A question associated with the uploaded “CEE Model Set 2082”; NOT an authenticated real 2026 past-paper question.

SEPARATE ADVANCED MOCK A harder practice item from the user-supplied 180-question mock, NOT an actual past-paper question.

PYQ-DERIVED • CEE-STYLE PRACTICE Additional exam-style practice designed around recurring topic patterns; not a historical PYQ.

What the source questions emphasize

PHYSICS — mechanics and applied numericals; electromagnetism, capacitance, optics, waves, thermodynamics, nuclear physics and semiconductors.

CHEMISTRY — chemical reactions and reagents; organic conversions, stereochemistry, acids and bases, periodic trends, kinetics, electrochemistry and calculations.

BOTANY — genetics, cell biology, plant anatomy, physiology, reproduction, classification, biotechnology and ecological relationships.

ZOOLOGY — animal diversity, human physiology, endocrine and reproductive systems, parasites and infectious diseases, tissues and evolution.

MAT — series, coding, rates/work, percentages, ages, relations, syllogisms and spatial/numerical reasoning.

How to use the five papers

Each paper contains 25 Physics + 25 Chemistry + 20 Botany + 20 Zoology + 10 MAT questions. Attempt the four options first; then inspect the highlighted answer and WHY line. Paper size is intentionally 100 items for short focused practice, while the entire book contains 500 MCQs.

Academic reference

Curriculum alignment should be checked against the latest Medical Education Commission publication: “Syllabus for Bachelor Level Common Entrance Examination, 2020 (Revised 2026),” published 29 April 2026 — mec.gov.np/en/detail/syllabus-for-bachelor-level-common-entrance-examination-2020-revised-2026.

Source files reviewed: CEE MBBS 2021.pdf, 2022.pdf, 2023.pdf, 2024.pdf, 2025.pdf, 2026.pdf (“Model Set 2082”), and 180 Marks CEE Based QNS.pdf. Some source scans contain damaged symbols or conflicting keys; no damaged diagram was reconstructed as an exact PYQ.

PYQ ANALYSIS PAPER 01

100 CEE MCQs • Four options • Answer and explanation after each question
PHYSICS 25 / CHEMISTRY 25 / BOTANY 20 / ZOOLOGY 20 / MAT 10
Source tag shown above every MCQ. "Advanced mock" and "model paper" labels do not indicate an official PYQ.

PHYSICS / 25 QUESTIONS

001 / Q001 SEPARATE ADVANCED MOCK • ref Q131

[Numerical] A block slides from rest down a frictionless height h, crosses a rough horizontal patch of length L (coefficient μ), then rises frictionlessly. If μL<h, its greatest final height is:

A. h+μL
B. μh/L
C. h−μL
D. h(1−μ)

ANSWER C • h−μL
WHY Energy lost to friction is μmgL, so mgh′ = mgh − μmgL and h′ = h − μL.

002 / Q002 SEPARATE ADVANCED MOCK • ref Q138

[Numerical] A uniform rod of length 2 m pivots about one end. A 6 N force perpendicular to the rod at its centre balances a perpendicular force F at the far end. F equals:

A. 1.5 N
B. 12 N
C. 6 N
D. 3 N

ANSWER D • 3 N
WHY The torque is τ = Fr⊥. Equate the applied moment with the resisting moment about the pivot.

003 / Q003 SEPARATE ADVANCED MOCK • ref Q179

Gamma rays differ from alpha particles because gamma rays:

A. are stopped more easily by paper than alpha rays
B. are electrons from nucleus
C. are neutral electromagnetic radiation with high penetration
D. carry charge +2e and mass 4 u

ANSWER C • are neutral electromagnetic radiation with high penetration
WHY Gamma rays are neutral photons, unlike massive charged α particles; gamma penetration is generally high.

004 / Q004 2024 • MEMORY-BASED • ref Q6

Which of the following statements is incorrect?

A. The unit of luminous intensity is Candela
B. The unit of Illuminance is Lux
C. The unit of Luminous flux is Lumen
D. The unit of Luminance is Lux/m²

ANSWER D • The unit of Luminance is Lux/m²
WHY Luminance uses cd/m² (candela per square metre); lux is the unit of illuminance.

005 / Q005 2024 • MEMORY-BASED • ref Q22

Which of the following is a vector quantity?

A. Charge
B. Electric field
C. Electric potential
D. Electric current

ANSWER B • Electric field
WHY The electric field has both a magnitude and direction and determines force F=qE.

006 / Q006 2024 • MEMORY-BASED • ref Q35

Which is the most accepted theory for the origin of the universe?

A. Big Bang theory
B. Pulsation Theory
C. Steady State Theory
D. Cosmozoic Theory

ANSWER A • Big Bang theory
WHY The Big Bang model explains the observed cosmic expansion and primordial light-element abundance.

007 / Q007 2023 • MEMORY-BASED • ref Q15

Red color of sky during sunrise & sunset is due to

A. Dispersion of light
B. Scattering of light
C. Refraction
D. Diffraction

ANSWER B • Scattering of light
WHY Shorter wavelengths scatter preferentially; during sunrise the long atmospheric path leaves reddish light.

008 / Q008 2022 • MEMORY-BASED • ref Q4

If momentum increases by 100% then KE increases by

A. 100%
B. 200%
C. 300%
D. 400%

ANSWER C • 300%
WHY With fixed mass, $K=p^2/(2m)$. Doubling momentum makes kinetic energy four times, a 300% rise.

009 / Q009 2022 • MEMORY-BASED • ref Q38

Angle of deviation is maximum for

A. Red
B. Violet
C. Green
D. Yellow

ANSWER B • Violet
WHY Violet is refracted more strongly than red in ordinary dispersion and has greatest prism deviation.

010 / Q010 2021 • ADAPTED

A boat 4 m long and 2 m wide sinks 1 cm deeper when a person boards. What is the mass of the person? (ρ_{water} = 1000 kg/m³)

A. 8 kg
B. 40 kg
C. 80 kg
D. 800 kg

ANSWER C • 80 kg
WHY Extra displaced mass = 4 × 2 × 0.01 × 1000 = 80 kg.

011 / Q011 SEPARATE ADVANCED MOCK • ref Q160

A charged particle moves parallel to a uniform magnetic field. Its magnetic force is:

A. qvB
B. zero
C. qvB/2
D. dependent only on mass

ANSWER B • zero
WHY Magnetic force magnitude is $|q|vB\sin\theta$, which vanishes when velocity is parallel to B.

012 / Q012 SEPARATE ADVANCED MOCK • ref Q166

[Numerical] Two identical capacitors C are first connected in parallel and then in series. The ratio Ceq(parallel):Ceq(series) is:

A. 1:4
B. 4:1
C. 2:1
D. 1:1

ANSWER B • 4:1
WHY Parallel identical capacitors give 2C; series identical capacitors give C/2; ratio 4:1.

013 / Q013 2024 • MEMORY-BASED • ref Q9

The electric potential of an electric dipole varies with distance as:

A. $V \propto r$
B. $V \propto 1/r$
C. $V \propto r^2$
D. $V \propto 1/r^2$

ANSWER D • $V \propto 1/r^2$
WHY At a distant point and fixed orientation, electric dipole potential $V \propto p\cos\theta/r^2$.

014 / Q014 2024 • MEMORY-BASED • ref Q43

The magnetic field inside a Solenoid is:

A. Directly proportional to Current
B. Inversely proportional to Current
C. Directly proportional to Length
D. Inversely proportional to number of turns

ANSWER A • Directly proportional to Current
WHY For a long solenoid $B \approx \mu nI$, so magnetic field strength scales directly with the current.

015 / Q015 2021 • ADAPTED

Escape speed from Earth is 11.2 km/s. Neglecting air resistance, the launch angle changes this speed to:

A. 5.6 km/s
B. 11.2 km/s
C. 15.8 km/s
D. 22.4 km/s

ANSWER B • 11.2 km/s
WHY Escape speed depends on gravitational potential and starting position, not launch direction.

016 / Q016 SEPARATE ADVANCED MOCK • ref Q145

A refrigerator cannot transfer heat from cold to hot without external work because that would violate the:

A. conservation of charge
B. second law of thermodynamics
C. law of gravitation
D. zeroth law only

ANSWER B • second law of thermodynamics
WHY A refrigerator needs external work to move heat from a cold region to a warmer region, as required by the second law.

017 / Q017 2023 • MEMORY-BASED • ref Q35

With rise in temperature, the Young's modulus of elasticity

A. Increases
B. Decreases
C. Remains constant
D. Becomes zero

ANSWER B • Decreases
WHY Heating generally reduces elastic stiffness because interatomic binding effectively softens.

018 / Q018 SEPARATE ADVANCED MOCK • ref Q151

[Numerical] A convex lens forms a real image twice the object size. If focal length is 10 cm, the object distance is:

A. 5 cm
B. 30 cm
C. 15 cm
D. 10 cm

ANSWER C • 15 cm
WHY For thin lenses, use 1/f = 1/v − 1/u with the chosen sign convention.

019 / Q019 2024 • MEMORY-BASED • ref Q16

Sodium has a work function of 2.0 eV. Light of wavelength 500 nm is incident. What is the approximate maximum speed of the emitted electrons?

A. 413 km/s
B. 430 km/s
C. 317 km/s
D. 467 km/s

ANSWER A • 413 km/s
WHY Photon energy ≈ 1240/500 = 2.48 eV. Kmax ≈ 0.48 eV, hence vmax ≈ 4.1 × 10^5 m/s.

020 / Q020 2022 • MEMORY-BASED • ref Q32

Which of following wave is not polarizable?

A. Light
B. X-ray
C. Sound
D. IR

ANSWER C • Sound
WHY Only transverse waves can show polarization.

021 / Q021 SEPARATE ADVANCED MOCK • ref Q180

In the photoelectric effect, raising light frequency above threshold at fixed intensity primarily increases:

A. maximum kinetic energy of emitted electrons
B. number of photons necessarily without limit
C. work function of metal
D. threshold frequency Page 23

ANSWER A • maximum kinetic energy of emitted electrons
WHY Use Kmax = hf − φ; no electrons are emitted below the threshold frequency.

022 / Q022 2024 • MEMORY-BASED • ref Q49

The half life of a radioactive substance is 1.28 x 109 s. Then, its mean life is:

A. 1.02 x 109 s
B. 1.33 x 109 s
C. 1.85 x 109 s
D. 1.58 x 109 s

ANSWER C • 1.85 x 109 s
WHY After n half-lives the surviving amount equals $N_0(½)^n$.

023 / Q023 2023 • MEMORY-BASED • ref Q27

In photoelectric effect, the slope of the straight line graph between stopping potential and frequency of the incident light gives t B Stopping: Potertia Wd A ?) oN Frequency (\) —> Dy

A. Work function
B. Kinetic energy of electron
C. Photoelectric current
D. Ratio of Planck's constant & charge of e-

ANSWER D • Ratio of Planck's constant & charge of e-
WHY Use Kmax = hf − φ; no electrons are emitted below the threshold frequency.

024 / Q024 EXPECTED • CEE-STYLE PRACTICE

The de Broglie wavelength of a particle varies inversely with its:

A. Momentum
B. Charge alone
C. Temperature alone
D. Atomic number

ANSWER A • Momentum
WHY λ = h/p for matter waves.

025 / Q025 EXPECTED • CEE-STYLE PRACTICE

If a convex lens has focal length 25 cm, its power in air is:

A. +0.25 D
B. +4 D
C. −4 D
D. +25 D

ANSWER B • +4 D
WHY Power P = 1/f(m) = 1/0.25 = +4 D.

CHEMISTRY / 25 QUESTIONS

026 / Q026 SEPARATE ADVANCED MOCK • ref Q81

For $N_2(g)+3H2(g) \rightleftharpoons 2NH3(g)$, an inert gas is added at constant volume. At unchanged temperature, which statement is correct?

A. Kp increases
B. Equilibrium shifts right because total pressure rises
C. Equilibrium shifts left because mole fraction falls
D. Equilibrium composition is unchanged because reacting partial pressures are unchanged

ANSWER D • Equilibrium composition is unchanged because reacting partial pressures are unchanged
WHY At constant volume and temperature, an inert gas does not alter the reacting species' partial pressures.

027 / Q027 SEPARATE ADVANCED MOCK • ref Q90

At equilibrium, ΔG for the reaction as written is zero, while ΔG° may be nonzero because:

A. all concentrations equal unity
B. forward and reverse activation energies vanish
C. Q has adjusted so $\Delta G^\circ + RT \ln Q = 0$
D. standard free energy never relates to K

ANSWER C • Q has adjusted so $\Delta G^\circ + RT \ln Q = 0$
WHY At equilibrium $\Delta G = \Delta G^\circ + RT \ln Q = 0$; ΔG° itself need not equal zero.

028 / Q028 SEPARATE ADVANCED MOCK • ref Q98

The first ionization energy of oxygen is lower than nitrogen despite greater nuclear charge mainly because oxygen has:

A. paired-electron repulsion in a 2p orbital
B. a larger principal shell
C. no shielding
D. a filled 2p subshell

ANSWER A • paired-electron repulsion in a 2p orbital
WHY Nitrogen has a stable half-filled $2p^3$ arrangement; oxygen $2p^4$ contains a paired-electron repulsion.

029 / Q029 2024 • MEMORY-BASED • ref Q15

Sodium is commercially prepared by the electrolysis of its fused chloride. The process is called:

A. Castner process
B. Solvay process
C. Down process
D. Kelner process

ANSWER C • Down process
WHY The Downs cell electrolyses molten NaCl to produce sodium metal at the cathode.

030 / Q030 2024 • MEMORY-BASED • ref Q38

Limiting ionic molar conductivities of Ba^{2+} and Cl^- are 127 and 76 S cm² mol^{-1}, respectively. Find the limiting equivalent conductivity of $BaCl_2$.

A. 279
B. 139.5
C. 203
D. 101.5

ANSWER B • 139.5
WHY Limiting molar conductivity of $BaCl_2$ is 127 + 2(76) = 279; its equivalent conductivity is 279/2 = 139.5.

031 / Q031 2025 • ADAPTED • ref Q16

Why does zinc usually fail to liberate H_2 when treated with nitric acid?

A. Zinc is less reactive than hydrogen
B. HNO_3 is a weak acid
C. HNO_3 provides no H^+
D. HNO_3 acts as an oxidizing acid and nitrate is reduced

ANSWER D • HNO_3 acts as an oxidizing acid and nitrate is reduced
WHY Nitric acid oxidizes the metal and nitrate is reduced; H_2 evolution is usually suppressed.

032 / Q032 2022 • MEMORY-BASED • ref Q37

Amino acid is amphoteric due to

A. Alkalinity
B. Acidity
C. Alkalinity & acidity
D. Saltiness

ANSWER C • Alkalinity & acidity
WHY Amino acids contain both acidic –COOH and basic $–NH_2$ functional groups.

033 / Q033 SEPARATE ADVANCED MOCK • ref Q88

In a galvanic cell, increasing the concentration of oxidized species in the reduction half-cell generally:

A. lowers its reduction potential by Nernst equation
B. reverses electron flow in every case
C. leaves potential necessarily zero
D. raises its reduction potential

ANSWER D • raises its reduction potential
WHY The Nernst equation shows increased oxidized-to-reduced ratio generally raises a reduction half-cell potential.

034 / Q034 SEPARATE ADVANCED MOCK • ref Q103

Transition metals commonly show variable oxidation states because:

A. their nuclei change charge in reactions
B. they lack d electrons entirely
C. their ns and (n−1)d energies are comparable
D. all their compounds are covalent

ANSWER C • their ns and (n−1)d energies are comparable
WHY The ns and (n−1)d orbital energies are close enough that different electrons can participate in bonding.

035 / Q035 SEPARATE ADVANCED MOCK • ref Q121

A peptide bond forms through condensation between:

A. amino and carboxyl groups with loss of water
B. two phosphate groups
C. an aldehyde and alkane only
D. two hydrocarbon groups with gain of oxygen

ANSWER A • amino and carboxyl groups with loss of water
WHY The –COOH group of one amino acid joins the $–NH_2$ group of another, releasing H_2O.

036 / Q036 2024 • MEMORY-BASED • ref Q3

Which of the following is an exception to the octet rule?

A. HF
B. NO_2
C. CCl_4
D. HNO_3

ANSWER B • NO_2
WHY NO_2 contains an odd number of valence electrons, so a conventional octet cannot hold for all atoms.

037 / Q037 2024 • MEMORY-BASED • ref Q14

The difference between the mass number and its atomic number gives the number of:

A. Protons
B. Neutrons
C. Electrons
D. Mesons

ANSWER B • Neutrons
WHY Mass number A counts protons plus neutrons; subtract atomic number Z to obtain neutron count $N=A-Z$.

038 / Q038 2024 • MEMORY-BASED • ref Q31

In the manufacture of Iron, limestone is used as:

A. Slag
B. Gangue
C. Flux
D. Activator

ANSWER C • Flux
WHY $CaCO_3$ decomposes to CaO, which combines with siliceous impurities to form removable slag.

039 / Q039 2024 • MEMORY-BASED • ref Q47

Galvanization is the process of coating:

A. Zinc on Iron
B. Copper on Iron
C. Iron on Copper
D. Iron on Zinc

ANSWER A • Zinc on Iron
WHY Galvanization protects iron from corrosion using a zinc coating that can act sacrificially.

040 / Q040 EXPECTED • CEE-STYLE PRACTICE

What is the principal role of concentrated H_2SO_4 during esterification of a carboxylic acid with an alcohol?

A. Oxidant only
B. Acid catalyst and dehydrating agent
C. Source of ammonia
D. Reducing agent

ANSWER B • Acid catalyst and dehydrating agent
WHY Concentrated sulfuric acid catalyzes ester formation and helps remove water.

041 / Q041 2023 • MEMORY-BASED • ref Q86

Which of the following reacts with Tollen's reagent depositing silver mirror?

A. Acetaldehyde
B. Acetone
C. Ethanol
D. Acetic acid

ANSWER A • Acetaldehyde
WHY An aldehyde reduces Tollens $[Ag(NH_3)_2]^+$ to metallic Ag while being oxidized.

042 / Q042 2025 • ADAPTED • ref Q4

Benzenediazonium chloride treated with CuCl (Sandmeyer reaction) gives:

A. Aniline
B. Phenol
C. Chlorobenzene
D. Benzaldehyde

ANSWER C • Chlorobenzene
WHY CuCl replaces the diazonium group with chlorine in a Sandmeyer reaction.

043 / Q043 2025 • ADAPTED • ref Q40

On heating ethanol with concentrated H_2SO_4 to approximately 170°C, the main organic product is:

A. Ethene
B. Ethane
C. Ethanal
D. Ethanoic acid

ANSWER A • Ethene
WHY Concentrated sulfuric acid dehydrates ethanol to ethene at about 170°C.

044 / Q044 2022 • MEMORY-BASED • ref Q35

Bohr's atomic spectrum is valid for

A. For hydrogen atom only
B. For hydrogen molecule
C. For hydrogen like single electron species
D. For any species

ANSWER C • For hydrogen like single electron species
WHY Bohr theory accurately describes hydrogen-like one-electron systems.

045 / Q045 SEPARATE ADVANCED MOCK • ref Q111

An aldehyde and a ketone have the same molecular formula. Tollens reagent distinguishes them because aldehydes:

A. cannot contain carbonyl groups
B. undergo only reduction
C. are always aromatic
D. are more readily oxidized under mild conditions

ANSWER D • are more readily oxidized under mild conditions
WHY For thin lenses, use $1/f = 1/v - 1/u$ with the chosen sign convention.

046 / Q046 SEPARATE ADVANCED MOCK • ref Q124

A compound C_3H_6O is oxidized by Tollens reagent and reduced to a primary alcohol. It is most consistent with:

A. propanoic acid
B. propan-2-ol
C. propanone
D. propanal

ANSWER D • propanal
WHY For thin lenses, use $1/f = 1/v - 1/u$ with the chosen sign convention.

047 / Q047 2024 • MEMORY-BASED • ref Q49

An alkene, on Ozonolysis gave acetaldehyde and acetone. The alkene may be:

A. But-2-ene
B. 2-Methylbut-2-ene
C. Butene
D. 2-Methylbutene

ANSWER B • 2-Methylbut-2-ene
WHY Ozonolysis cleaves a carbon–carbon double bond to give carbonyl fragments.

048 / Q048 2025 • ADAPTED • ref Q (OCR distractors repaired)

Nylon 6,6 is formed by the condensation of the monomers:

A. Butadiene and styrene
B. Ethylene glycol and terephthalic acid
C. Phenol and formaldehyde
D. Hexane-1,6-diamine and hexanedioic acid

ANSWER D • Hexane-1,6-diamine and hexanedioic acid
WHY Nylon-6,6 forms by condensation of hexamethylenediamine and adipic acid.

049 / Q049 2026 • MODEL PAPER

Which catalyst is classically used for the hydrogenation of an alkene to an alkane?

A. Ni or Pt
B. Concentrated H_2SO_4 only
C. $KMnO_4$ only
D. $AgNO_3$ only

ANSWER A • Ni or Pt
WHY Finely divided Ni, Pt or Pd catalyzes addition of H_2 across C=C.

050 / Q050 EXPECTED • CEE-STYLE PRACTICE

For a first-order reaction, the half-life is:

A. Proportional to initial concentration
B. Independent of initial concentration
C. Zero
D. Dependent only on volume

ANSWER B • Independent of initial concentration
WHY $t_{1/2} = 0.693/k$ for first-order kinetics.

BOTANY / 20 QUESTIONS

051 / Q051 SEPARATE ADVANCED MOCK • ref Q41

Heating an enzyme gradually reduces reaction rate even though substrate remains abundant. The best molecular explanation is:

A. substrate becomes an enzyme
B. active-site conformation is disrupted beyond an optimum
C. peptide bonds always hydrolyse at body temperature
D. activation energy becomes zero

ANSWER B • active-site conformation is disrupted beyond an optimum
WHY Most enzymes have a temperature optimum; heat beyond it unfolds active-site structure and reduces catalysis.

052 / Q052 SEPARATE ADVANCED MOCK • ref Q62

A testcross yields offspring in a 1:1 ratio of parental types with no recombinants. The most defensible inference is:

A. the two loci are completely linked in that cross
B. both genes are lethal
C. independent assortment produced only parentals
D. the tested individual is homozygous

ANSWER A • the two loci are completely linked in that cross
WHY Complete linkage keeps alleles on the same homolog inherited together, yielding only parental combinations.

053 / Q053 2024 • MEMORY-BASED • ref Q1

Which of the following is not a cause of variation?

A. Crossing over
B. Mutation
C. Linkage
D. Independent assortment

ANSWER C • Linkage
WHY Linkage keeps nearby genes inherited together and reduces independent reshuffling, unlike mutation and crossing over.

054 / Q054 2024 • MEMORY-BASED • ref Q30

The dominant pigment in Rhodophyceae is:

A. Chlorophyll b
B. Chlorophyll c
C. Phycocyanin
D. Phycoerythrin

ANSWER D • Phycoerythrin
WHY Red algae contain abundant red phycobiliprotein phycoerythrin, which masks chlorophyll.

055 / Q055 2024 • MEMORY-BASED • ref Q35

Which is the process of converting atmospheric nitrogen into usable form?

A. Ammonification
B. Nitrification
C. Nitrogen fixation
D. Nitrogen assimilation

ANSWER C • Nitrogen fixation
WHY Nitrogen fixation converts atmospheric N_2 into ammonia or related biologically usable nitrogen forms.

056 / Q056 2023 • MEMORY-BASED • ref Q108

Protoplasm was first observed by:

A. Dujardin
B. Purkinje
C. Van Mohl
D. Corti

ANSWER D • Corti
WHY Corti is credited in many traditional botany texts with early observation of living protoplasm; distinguish this from its later naming.

057 / Q057 2023 • MEMORY-BASED • ref Q131

PCR technique was discovered by:

A. Kary Mullis
B. Sanger
C. Wilmut
D. Cohn

ANSWER A • Kary Mullis
WHY Kary Mullis developed PCR, which amplifies a specific DNA region using thermal cycling.

058 / Q058 2025 • MEMORY-BASED • ref Q58

Which of the following has narrow lumen:

A. Sclerenchymatous fibres
B. Stone cell
C. Scleids
D. Sclrenchyme

ANSWER A • Sclerenchymatous fibres
WHY Sclerenchyma fibres have thick lignified walls, leaving a narrow central lumen.

059 / Q059 2025 • ADAPTED • ref Q67

When two species benefit from one another and depend on the association for survival, this is:

A. Amensalism
B. Obligate mutualism
C. Commensalism
D. Predation

ANSWER B • Obligate mutualism
WHY Both partners benefit and the obligate relationship is required for survival.

060 / Q060 2025 • MEMORY-BASED • ref Q78

Which of the following is disaccharide

A. Maltose
B. Glucose
C. Cellulose
D. Starch 79, In maize male anther matures faster than stigma then, maize is

ANSWER A • Maltose
WHY Maltose has two glucose units linked glycosidically; glucose alone is a monosaccharide.

061 / Q061 2022 • MEMORY-BASED • ref Q12

Plants living in salty soil are called

A. Oxylophytes
B. Lithophytes
C. Halophytes
D. Psammophytes

ANSWER C • Halophytes
WHY Halophytes tolerate saline soil through adaptations such as ion control and salt secretion.

062 / Q062 SEPARATE ADVANCED MOCK • ref Q75

During ascent of sap in a tall tree, the continuity of the water column depends most directly on:

A. cohesion among water molecules and tension from transpiration
B. root hairs pushing water to any height without loss
C. active pumping by every vessel element
D. phloem pressure only

ANSWER A • cohesion among water molecules and tension from transpiration
WHY Cohesion between water molecules maintains a continuous column that transpiration pull can lift in xylem.

063 / Q063 2024 • MEMORY-BASED • ref Q29

Bicollateral vascular bundles are present in:

A. Cucurbitaceae
B. Compositae
C. Graminae
D. Cruciferae

ANSWER A • Cucurbitaceae
WHY Cucurbit stems characteristically contain bicollateral bundles, with phloem on both sides of xylem.

064 / Q064 2022 • MEMORY-BASED • ref Q5

Bicoilateral vascular bundle is present in:

A. Cruciferae
B. Cucurbita
C. Malvaceae
D. Leguminosae

ANSWER B • Cucurbita
WHY Cucurbita is a classic example of a bicollateral vascular bundle.

065 / Q065 2022 • ADAPTED • ref Q39

Water enters a typical root-hair cell from dilute soil solution primarily by:

A. Osmosis
B. Active pumping of water molecules
C. Simple diffusion of salts into cytoplasm
D. Capillary action only

ANSWER A • Osmosis
WHY Water follows a water-potential gradient across the selectively permeable plasma membrane.

066 / Q066 SEPARATE ADVANCED MOCK • ref Q58

A secretory plant cell makes large amounts of protein. Which pathway is most directly involved?

A. Rough ER to Golgi to vesicles
B. Smooth ER to centriole only
C. Nucleus to cell wall by diffusion of DNA
D. Chloroplast to vacuole without ribosomes

ANSWER A • Rough ER to Golgi to vesicles
WHY Rough ER synthesizes secreted proteins, which are processed in the Golgi and carried in vesicles.

067 / Q067 2024 • MEMORY-BASED • ref Q4

If a cell has 1.2×10^{-12} g DNA in G_1, what will its DNA mass be after replication in G_2?

A. 1.2×10^{-12} gm
B. 2.4×10^{-12} gm
C. 1.2×10^{-6} gm
D. 2.4×10^{-6} gm

ANSWER B • 2.4×10^{-12} gm
WHY DNA doubles during S phase; hence DNA mass at G_2 is twice that measured in G_1.

068 / Q068 2024 • MEMORY-BASED • ref Q39

If one chromosome is absent from a diploid set, the condition is termed as:

A. Trisomy
B. Monosomy
C. Nullisomy
D. Tetrasomy

ANSWER B • Monosomy
WHY Monosomy means 2n−1 chromosomes; trisomy means 2n+1.

069 / Q069 2023 • MEMORY-BASED • ref Q126

Mitochondria is semi-autonomous organelle due to:

A. Presence of oxysome
B. Presence of naked DNA
C. Presence of cristae and matrix
D. Absence of RNA

ANSWER B • Presence of naked DNA
WHY Mitochondria have their own circular DNA and ribosomes but still depend heavily on nuclear genes.

070 / Q070 2025 • MEMORY-BASED • ref Q83

Which of the following unwinds DNA molecule?

A. Helicase
B. Ligase
C. Polymerase
D. Topoisomerase

ANSWER A • Helicase
WHY Helicase separates DNA strands by disrupting hydrogen bonds at the replication fork.

ZOOLOGY / 20 QUESTIONS

071 / Q071 2024 • ADAPTED • ref Q7

The rasping feeding organ of most molluscs is called the:

A. Osphradium
B. Radula
C. Ctenidium
D. Nephridium

ANSWER B • Radula
WHY A radula is a toothed chitinous ribbon used for scraping food.

072 / Q072 2024 • ADAPTED • ref Q26

Which structure is not necessarily present throughout the adult life of every chordate?

A. Dorsal hollow nerve cord at some stage
B. Notochord at some stage
C. Pharyngeal slits at some stage
D. A persistent vertebral column

ANSWER D • A persistent vertebral column
WHY All chordates show core characters during development, but not all are vertebrates.

073 / Q073 2023 • MEMORY-BASED • ref Q144

Which of the following is true for protozoa?

A. One nuclei
B. One celled
C. One vacuole
D. Cell walled

ANSWER B • One celled
WHY Protozoa are traditionally classified as unicellular eukaryotic organisms.

074 / Q074 2025 • MEMORY-BASED • ref Q98

In stomach of frog there is a mesentery. It is called

A. Mesogaster
B. Cardiac gaster
C. Pylonicgaster
D. Endogaster

ANSWER A • Mesogaster
WHY The mesogaster is the peritoneal fold or mesentery associated with the frog stomach.

075 / Q075 2026 • MODEL PAPER

In older zoological classification, tetraneurous organization is associated with:

A. Annelida
B. Mollusca
C. Arthropoda
D. Echinodermata

ANSWER B • Mollusca
WHY Several molluscs display paired longitudinal nerve cords in textbook descriptions.

076 / Q076 SEPARATE ADVANCED MOCK • ref Q35

Antibiotics do not cure influenza primarily because influenza virus:

A. is larger than bacteria
B. uses host-cell machinery and lacks bacterial targets
C. is eliminated only by red cells
D. has a cell wall impermeable to all drugs

ANSWER B • uses host-cell machinery and lacks bacterial targets
WHY Antibiotics target bacterial structures/processes; influenza is viral and lacks those bacterial targets.

077 / Q077 2024 • ADAPTED • ref Q6

Which early human species is particularly associated with widespread controlled use of fire?

A. Australopithecus afarensis
B. Homo erectus
C. Homo habilis only
D. Ardipithecus ramidus

ANSWER B • Homo erectus
WHY Homo erectus is commonly associated with early controlled fire use, though dating remains debated.

078 / Q078 2024 • ADAPTED • ref Q15

Which specialized epithelium lines the urinary bladder?

A. Simple cuboidal
B. Transitional (urothelium)
C. Stratified squamous keratinized
D. Ciliated columnar

ANSWER B • Transitional (urothelium)
WHY Urothelium stretches while protecting underlying tissue from urine.

079 / Q079 2024 • MEMORY-BASED • ref Q28

Which of the following drug is correctly matched with its category?

A. Amphetamine - Stimulant
B. Benzodiazepam – Analgesic
C. LSD – Narcotic
D. Morphine – Psychidelic drug

ANSWER A • Amphetamine - Stimulant
WHY Amphetamines stimulate the central nervous system by increasing monoamine signaling.

080 / Q080 2023 • ADAPTED • ref Q141

Ascaris is correctly described as:

A. Truly coelomate and metameric
B. Truly coelomate and unsegmented
C. Acoelomate and metameric
D. Pseudocoelomate and unsegmented

ANSWER D • Pseudocoelomate and unsegmented
WHY Ascaris is a nematode with a pseudocoelom and no metameric segmentation.

081 / Q081 2023 • MEMORY-BASED • ref Q160

High altitude sickness is due to:

A. Partial pressure of oxygen
B. Carbon dioxide
C. Dehydration
D. Decrease efficiency of hemoglobin

ANSWER A • Partial pressure of oxygen
WHY At high altitude the oxygen partial pressure falls, reducing oxygen loading into blood.

082 / Q082 2023 • ADAPTED • ref Q177

Amphetamine is classified pharmacologically as a:

A. Depressant
B. Stimulant
C. Opioid analgesic
D. General anesthetic

ANSWER B • Stimulant
WHY Amphetamine is a central nervous system stimulant.

083 / Q083 2025 • MEMORY-BASED • ref Q102

Voluntary control and balancing is done by?

A. Cerebrum
B. Cerebellum
C. Pons varolli
D. Medulla oblongata

ANSWER B • Cerebellum
WHY The cerebellum coordinates movement, balance, posture and motor accuracy.

084 / Q084 2022 • ADAPTED • ref Q5

Which Plasmodium species is especially associated with a long incubation due to a 72-hour blood-stage cycle?

A. P. vivax
B. P. malariae
C. P. ovale
D. P. falciparum

ANSWER B • P. malariae
WHY P. malariae has a 72-hour erythrocytic cycle, often giving quartan fever; incubation intervals overlap among species.

085 / Q085 2022 • MEMORY-BASED • ref Q21

Signet ring stage is present in

A. erythrocytic
B. pre-erythrocytic
C. exo-erythrocytic
D. sporogony

ANSWER A • erythrocytic
WHY The malaria trophozoite becomes a ring or signet-ring appearance within infected erythrocytes.

086 / Q086 2022 • ADAPTED • ref Q34

Branched striated muscle fibers with intercalated discs are characteristic of:

A. Smooth muscle
B. Cardiac muscle
C. Skeletal muscle
D. Cartilage

ANSWER B • Cardiac muscle
WHY Intercalated discs connect cardiomyocytes electrically and mechanically.

087 / Q087 2024 • ADAPTED • ref Q5

Which cranial nerve is classically divided into ophthalmic, maxillary and mandibular branches?

A. Facial (VII)
B. Glossopharyngeal (IX)
C. Trigeminal (V)
D. Hypoglossal (XII)

ANSWER C • Trigeminal (V)
WHY The trigeminal nerve has three main divisions: V_1, V_2 and V_3.

088 / Q088 2024 • MEMORY-BASED • ref Q34

Which of the following is an autoimmune disease that causes joint pain?

A. Rheumatoid arthritis
B. Osteoporosis
C. Rickets
D. Exophthalmic goiter

ANSWER A • Rheumatoid arthritis
WHY Rheumatoid arthritis is a chronic autoimmune inflammatory joint disease.

089 / Q089 2023 • MEMORY-BASED • ref Q158

Which of the following is the mode of transmission of HIV?

A. Inhaling cocaine
B. Breast feeding
C. Touching
D. Sharing utensils

ANSWER B • Breast feeding
WHY An infected mother can transmit HIV to her baby through breast milk, especially without prevention measures.

090 / Q090 2025 • MEMORY-BASED • ref Q103

Mosquito infect the human after the completion of which stage?

A. Formation of gametocytes
B. Fortnation of ookinate and oocytes
C. Sporogony in the gut wall
D. Pre-erythrocytic cycle

ANSWER C • Sporogony in the gut wall
WHY Sporogony in the Anopheles mosquito produces infective sporozoites that migrate to salivary glands.

MENTAL AGILITY (MAT) / 10 QUESTIONS

091 / Q091 EXPECTED • CEE-STYLE PRACTICE

Find the missing number in the sequence 2, 6, 12, 20, 30, ?

A. 36
B. 40
C. 42
D. 48

ANSWER C • 42
WHY Successive differences are +4, +6, +8, +10, so the next is +12 → 42.

092 / Q092 2026 • MODEL PAPER

If 3 identical machines complete 3 tasks in 3 minutes, 9 machines complete 9 identical tasks in:

A. 1 minute
B. 3 minutes
C. 9 minutes
D. 27 minutes

ANSWER B • 3 minutes
WHY Each machine completes one task in three minutes; nine machines work simultaneously.

093 / Q093 EXPECTED • CEE-STYLE PRACTICE

Identify the next term: 3, 9, 27, 81, ?

A. 162
B. 243
C. 324
D. 729

ANSWER B • 243
WHY Each term is multiplied by three.

094 / Q094 EXPECTED • CEE-STYLE PRACTICE

All surgeons are doctors; some doctors are researchers. Which conclusion necessarily follows?

A. All researchers are surgeons
B. Some surgeons are researchers
C. All surgeons are doctors
D. No doctors are surgeons

ANSWER C • All surgeons are doctors
WHY Only the original universal statement is guaranteed; the sets may not overlap elsewhere.

095 / Q095 2024 • MEMORY-BASED • reformulated Q1

In the word CLEARING, how many letter pairs have the same number of letters between them as in the alphabet, counting either alphabetic direction?

A. 0
B. 1
C. 2
D. 3

ANSWER C • 2
WHY C–E and I–G each have one letter between in both the word and alphabet.

096 / Q096 2024 • MEMORY-BASED • reformulated Q15

One typist prints 50 pages in 8 hours and another 50 pages in 6 hours. Together, how long to print 100 pages?

A. 6 h
B. 6 6/7 h
C. 7 1/2 h
D. 8 h

ANSWER B • 6 6/7 h
WHY Combined speed = 50/8 + 50/6 = 175/12 pages/h; time =100÷(175/12)=48/7 h.

097 / Q097 PYQ-DERIVED • CEE-STYLE PRACTICE

A can complete a task in 8 days and B can do it in 12 days. They work together for 2 days. What fraction remains?

A. 7/12
B. 5/12
C. 1/3
D. 3/4

ANSWER A • 7/12
WHY Together their 2-day work =2(1/8+1/12)=5/12; remaining 7/12.

098 / Q098 PYQ-DERIVED • CEE-STYLE PRACTICE

Complete the series: 2, 5, 10, 17, 26, 37, ?

A. 48
B. 49
C. 50
D. 52

ANSWER C • 50
WHY Successive odd increments 3,5,7,9,11,13 give 50.

099 / Q099 PYQ-DERIVED • CEE-STYLE PRACTICE

A walks 6 km east then 8 km north. What is the shortest distance from the starting point?

A. 10 km
B. 12 km
C. 14 km
D. 16 km

ANSWER A • 10 km
WHY Perpendicular displacement =√(6²+8²)=10 km.

100 / Q100 PYQ-DERIVED • CEE-STYLE PRACTICE

A clock shows 3:30. What is the smaller angle between the hour and minute hands?

A. 60°
B. 75°
C. 90°
D. 105°

ANSWER B • 75°
WHY Minute hand=180°, hour hand=3×30+30×0.5=105°; difference 75°.

PYQ ANALYSIS PAPER 02

100 CEE MCQs • Four options • Answer and explanation after each question
PHYSICS 25 / CHEMISTRY 25 / BOTANY 20 / ZOOLOGY 20 / MAT 10
Source tag shown above every MCQ. "Advanced mock" and "model paper" labels do not indicate an official PYQ.

PHYSICS / 25 QUESTIONS

101 / Q001 SEPARATE ADVANCED MOCK • ref Q133

[Numerical] A 2 kg body moving at 6 m/s sticks to a 1 kg body at rest. The fraction of initial kinetic energy lost is:

A. 3/4
B. 1/2
C. 2/3
D. 1/3

ANSWER D • 1/3
WHY Use momentum conservation to find common final velocity, then compare initial and final kinetic energies.

102 / Q002 SEPARATE ADVANCED MOCK • ref Q139

For uniform circular motion, work done by the centripetal force over any interval is zero because the force is:

A. opposite to velocity
B. perpendicular to instantaneous displacement
C. constant in direction
D. zero

ANSWER B • perpendicular to instantaneous displacement
WHY For circular motion, force is radial whereas displacement is tangential; W = F·s = 0.

103 / Q003 2024 • MEMORY-BASED • ref Q1

Which of the following quantity is responsible for imparting angular acceleration?

A. Force
B. Torque
C. Angular momentum
D. Moment of Inertia

ANSWER B • Torque
WHY Net torque produces angular acceleration according to $\tau = I\alpha$.

104 / Q004 2024 • MEMORY-BASED • ref Q8

A man goes to work in his car with a velocity of 60km/hr and quickly returns with a velocity of 40km/hr. Calculate the average speed for the total journey

A. 50km/hr
B. 48km/hr
C. 60km/hr
D. 0 km/hr

ANSWER B • 48km/hr
WHY For equal out-and-back distances use the harmonic mean 2uv/(u+v), not the arithmetic mean.

105 / Q005 2024 • MEMORY-BASED • ref Q23

Emission of gamma radiation results in:

A. Increase in atomic number by 1 unit
B. Decrease in atomic mass by 4 units
C. Both a and b
D. No change in atomic number and atomic mass

ANSWER D • No change in atomic number and atomic mass
WHY Gamma emission changes nuclear energy but not mass number or atomic number.

106 / Q006 2024 • MEMORY-BASED • ref Q39

The acceleration due to gravity of a planet is twice that of the Earth and its diameter is double that of the Earth. If the escape velocity on Earth is 11.2 km/s, then the escape velocity of the planet is:

A. 11.2 km/s
B. 22.4 km/s
C. 5.6 km/s
D. 44.8 km/s

ANSWER B • 22.4 km/s
WHY Escape speed follows $v_e = \sqrt{(2GM/R)}$; it is independent of launch direction.

107 / Q007 2023 • MEMORY-BASED • ref Q18

In a glass having liquid whose cohesive force > adhesive force, the meniscus formed is

A. Concave
B. Convex
C. Plane
D. Oval

ANSWER B • Convex
WHY If cohesion exceeds adhesion the liquid avoids wetting the wall, giving a convex meniscus.

108 / Q008 2022 • MEMORY-BASED • ref Q12

The 'g' decreases in going from surface to deep down inside the earth. What happens to value of g in going to height from earth surface?

A. Increases
B. Decreases
C. Remains constant
D. None

ANSWER B • Decreases
WHY Above Earth, $g=GM/(R+h)^2$; increasing altitude reduces g.

109 / Q009 2022 • ADAPTED • ref Q41

At fixed molar mass, the root-mean-square speed of ideal-gas molecules is proportional to:

A. T
B. 1/T
C. T^2
D. $\sqrt{T}$

ANSWER D • $\sqrt{T}$
WHY $v_{rms} = \sqrt{(3RT/M)}$, so speed rises with the square root of absolute temperature.

110 / Q010 2021 • ADAPTED

For a fixed-mass object, kinetic energy rises by approximately 4%. The corresponding approximate momentum increase is:

A. 1%
B. 2%
C. 4%
D. 8%

ANSWER B • 2%
WHY $p \propto \sqrt{K}$, so a small percentage change in p is half that in K.

111 / Q011 SEPARATE ADVANCED MOCK • ref Q161

Two long parallel wires carry currents in the same direction. They:

A. exert no force
B. alternate attraction and repulsion
C. repel
D. attract

ANSWER D • attract
WHY Currents in parallel wires flowing in the same direction produce attractive magnetic forces.

112 / Q012 SEPARATE ADVANCED MOCK • ref Q167

A dielectric is inserted into an isolated charged capacitor. Which pair decreases?

A. Capacitance and charge
B. Charge and capacitance
C. Capacitance and electric permittivity
D. Potential difference and stored energy

ANSWER D • Potential difference and stored energy
WHY For isolated Q fixed, adding dielectric increases C; $V=Q/C$ and $U=Q^2/(2C)$ decrease.

113 / Q013 2024 • MEMORY-BASED • ref Q13

The unit of self inductance is:

A. Volt/Ampere
B. Volt-sec/Ampere
C. Volt/Ampere-sec
D. Volt-Ampere/sec

ANSWER B • Volt-sec/Ampere
WHY The induced emf opposes flux change: $e = -L\,dI/dt$.

114 / Q014 EXPECTED • CEE-STYLE PRACTICE

A transistor operates in saturation as a switch when:

A. Both junctions are reverse-biased
B. Both base–emitter and base–collector junctions are forward-biased
C. Only the collector–base junction is reverse-biased
D. The collector current is always zero

ANSWER B • Both base-emitter and base-collector junctions are forward-biased
WHY An ideal saturated BJT switch has both p–n junctions forward-biased.

115 / Q015 2026 • MODEL PAPER

A DC transformer gives no sustained secondary voltage because steady direct current produces:

A. Alternating field
B. Zero primary resistance
C. Continuously rising flux
D. No time-varying magnetic flux

ANSWER D • No time-varying magnetic flux
WHY Faraday induction requires changing linked magnetic flux.

116 / Q016 SEPARATE ADVANCED MOCK • ref Q147

At the same temperature, molecules of H_2 and O_2 have equal average translational kinetic energy, but H_2 has:

A. zero momentum always
B. higher rms speed
C. the same rms speed
D. lower rms speed

ANSWER B • higher rms speed
WHY $v_{rms}=\sqrt{(3RT/M)}$; lighter H_2 molecules move faster than O_2 at the same temperature.

117 / Q017 EXPECTED • CEE-STYLE PRACTICE

An ideal gas at fixed temperature is compressed from volume V to 0.9V. What is the ratio of final to initial pressure?

A. 0.90
B. 1.10
C. 10/9
D. 9/10

ANSWER C • 10/9
WHY Boyle law $P_1V = P_2(0.9V)$ gives $P_2/P_1 = 1/0.9 = 10/9$.

118 / Q018 SEPARATE ADVANCED MOCK • ref Q152

When light passes from air to glass, which pair remains unchanged?

A. Frequency and phase velocity
B. Speed and wavelength
C. Wavelength and speed
D. Frequency and color as set by frequency

ANSWER D • Frequency and color as set by frequency
WHY Light frequency stays fixed across a stationary interface, preserving perceived color, while speed and λ change.

119 / Q019 2024 • ADAPTED • ref Q30

For a circular telescope aperture of diameter D, the Rayleigh minimum resolvable angle in radians is:

A. 1.22D/λ
B. 1.22λ/D
C. λD/1.22
D. D/λ

ANSWER B • 1.22λ/D
WHY The diffraction-limited angular separation is approximately θ = 1.22λ/D.

120 / Q020 SEPARATE ADVANCED MOCK • ref Q170

[Numerical] For a radioactive sample with half-life 6 h, the fraction remaining after 18 h is:

A. 1/6
B. 1/18
C. 1/8
D. 1/3

ANSWER C • 1/8
WHY After n half-lives the surviving amount equals $N_0(½)^n$.

121 / Q021 2024 • MEMORY-BASED • ref Q15

Which is correct about the forbidden energy gap in conductor, semi-conductor and insulator?

A. The energy gap in conductors is never zero
B. The energy gap in insulators is the widest
C. The energy gap in semiconductors is the smallest
D. The energy gap in insulators is zero

ANSWER B • The energy gap in insulators is the widest
WHY Insulators have large band gaps; semiconductors have smaller ones and conductors have overlapping or touching bands.

122 / Q022 2023 • MEMORY-BASED • ref Q6

Hard X-ray differ from soft X-ray in having

A. Low wavelength
B. Low energy
C. Low frequency
D. Long wavelength

ANSWER A • Low wavelength
WHY Hard X-rays have higher photon energy and shorter wavelength than soft X-rays.

123 / Q023 2023 • MEMORY-BASED • ref Q45

The impurity atom used to make P-type semiconductor 1s

A. Trivalent
B. Pentavalent
C. Tetravalent
D. Divalent

ANSWER A • Trivalent
WHY Trivalent acceptors create holes in Si or Ge and therefore yield p-type material.

124 / Q024 EXPECTED • CEE-STYLE PRACTICE

A radioactive nuclide passes through three half-lives. The surviving fraction is:

A. 1/2
B. 1/4
C. 1/8
D. 1/16

ANSWER C • 1/8
WHY The remaining quantity is $(1/2)^3 = 1/8$.

125 / Q025 EXPECTED • CEE-STYLE PRACTICE

For a diffraction grating at fixed wavelength, increasing slit spacing makes the diffraction angle for a given order:

A. Increase
B. Decrease
C. Remain fixed
D. Reach 90° always

ANSWER B • Decrease
WHY From $d \sin\theta = n\lambda$, a larger d reduces $\sin\theta$.

CHEMISTRY / 25 QUESTIONS

126 / Q026 SEPARATE ADVANCED MOCK • ref Q83

Equal masses of two ideal gases at the same temperature have rms speeds in ratio 2:1. Their molar masses are in ratio:

A. 2:1
B. 1:2
C. 1:4
D. 4:1

ANSWER C • 1:4
WHY At constant T, $v_{rms} = \sqrt{(3RT/M)}$, so lighter gas molecules have higher rms speeds.

127 / Q027 SEPARATE ADVANCED MOCK • ref Q92

Real gases approach ideal behavior most closely at:

A. critical point only
B. high pressure and low temperature
C. low volume with strong attraction
D. low pressure and high temperature

ANSWER D • low pressure and high temperature
WHY Low pressure and high temperature minimize intermolecular attraction and finite-volume effects.

128 / Q028 SEPARATE ADVANCED MOCK • ref Q105

Amphoteric Al_2O_3 reacts with both acid and strong base. The best interpretation is that it can:

A. act solely as neutral oxide
B. only release oxygen gas
C. change aluminium atomic number
D. behave as basic oxide toward acid and acidic oxide toward base

ANSWER D • behave as basic oxide toward acid and acidic oxide toward base
WHY Al_2O_3 is amphoteric: it reacts as a base with acids and as an acid with strong bases.

129 / Q029 2024 • MEMORY-BASED • ref Q21

Which of the following forward reactions is favored by an increase in pressure?

A. $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
B. $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$
C. $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$
D. $2SO2(g) + O_2(g) \rightleftharpoons 2SO3(g)$

ANSWER D • $2SO2(g) + O_2(g) \rightleftharpoons 2SO3(g)$
WHY Increasing pressure favors the side with fewer gaseous moles: 3→2 in SO_2 oxidation.

130 / Q030 2024 • MEMORY-BASED • ref Q45

Lyman series of Hydrogen spectrum lies in which region of electromagnetic spectrum?

A. Visible region
B. Infrared region
C. Ultraviolet region
D. None of the above

ANSWER C • Ultraviolet region
WHY Hydrogen Lyman transitions end at n=1 and emit ultraviolet photons.

131 / Q031 2025 • MEMORY-BASED • ref Q20

Transition metal show variable oxidation state, due to emission of electron from

A. (n-1) d orbital
B. (n~1)d orbital
C. us orbital
D. np orbital

ANSWER A • (n-1) d orbital
WHY Transition metals can lose ns as well as (n−1)d electrons, giving several stable oxidation states.

132 / Q032 EXPECTED • CEE-STYLE PRACTICE

At constant temperature, doubling the volume of an ideal gas changes its pressure to:

A. Double
B. Half
C. Four times
D. Unchanged

ANSWER B • Half
WHY Boyle's law gives $P \propto 1/V$ at fixed T and n.

133 / Q033 SEPARATE ADVANCED MOCK • ref Q91

A saturated solution of a sparingly soluble salt receives a common ion. Precipitation occurs when:

A. ionic product exceeds Ksp
B. ionic product falls below Ksp
C. temperature alone is unchanged
D. Ksp becomes zero

ANSWER A • ionic product exceeds Ksp
WHY Adding a common ion raises the ionic product and drives the dissolution equilibrium toward undissolved salt.

134 / Q034 SEPARATE ADVANCED MOCK • ref Q104

Aqueous Cu^{2+} is colored whereas Zn^{2+} is usually colorless because Cu^{2+} has:

A. a completely filled d subshell like Zn^{2+}
B. no d electrons
C. partially filled d orbitals permitting d-level transitions
D. only s-s transitions in visible light

ANSWER C • partially filled d orbitals permitting d-level transitions
WHY Cu^{2+} (d^9) permits electronic d transitions; Zn^{2+} (d^{10}) lacks these visible d–d transitions.

135 / Q035 SEPARATE ADVANCED MOCK • ref Q125

Soap cleans oily dirt poorly in hard water chiefly because Ca^{2+} and Mg^{2+}:

A. increase soap solubility indefinitely
B. oxidize water into oxygen
C. form insoluble salts with fatty-acid anions
D. convert oil to glucose

ANSWER C • form insoluble salts with fatty-acid anions
WHY Ca^{2+} and Mg^{2+} form insoluble fatty-acid salts (soap scum), reducing cleansing ability.

136 / Q036 2024 • MEMORY-BASED • ref Q4

A chemical is used in the preparation of Bakelite. It is also found to give positive $FeCl_3$ test. The name of the reactant is:

A. Phenol
B. Formaldehyde
C. Benzaldehyde
D. Toluene

ANSWER A • Phenol
WHY Phenol gives the characteristic ferric-chloride reaction and reacts with formaldehyde to form Bakelite.

137 / Q037 2024 • MEMORY-BASED • ref Q17

The conjugate acid of HCO_3- is

A. H_2CO_3
B. HCO 3- -
C. CO 3- -
D. CO_2

ANSWER A • H_2CO_3
WHY A conjugate acid differs by one added proton: $HCO_3^- + H^+ \rightarrow H_2CO_3$.

138 / Q038 2024 • MEMORY-BASED • ref Q39

Which of the following is a neutral oxide?

A. CO
B. NO_2
C. CO_2
D. SiO_2

ANSWER A • CO
WHY CO is neutral, unlike acidic CO_2 and SO_2 or basic metal oxides.

139 / Q039 2024 • MEMORY-BASED • ref Q50

A fuel is found to contain 20% n- Heptane. Its octane number is:

A. 20
B. 40
C. 60
D. 80

ANSWER D • 80
WHY By definition iso-octane rates 100 and n-heptane rates 0; 80% iso-octane gives octane number 80.

140 / Q040 EXPECTED • CEE-STYLE PRACTICE

Which reactant usually gives a secondary alcohol when treated with a Grignard reagent followed by acidic work-up?

A. Formaldehyde
B. An aldehyde other than formaldehyde
C. A ketone
D. Carbon dioxide

ANSWER B • An aldehyde other than formaldehyde
WHY Addition to R–CHO gives R–CH(OH)–R′, a secondary alcohol. Ketones usually give tertiary alcohols.

141 / Q041 2023 • MEMORY-BASED • ref Q88

Bohr's model failed to explain

A. Stark & Zeeman effect
B. Hydrogen spectrum
C. Atomic spectrum
D. Angular momentum is integral multiple of oh

ANSWER A • Stark & Zeeman effect
WHY Bohr theory accurately describes hydrogen-like one-electron systems.

142 / Q042 2025 • ADAPTED • ref Q25

Acetone on prolonged condensation with concentrated H_2SO_4 may form:

A. Benzene
B. Mesitylene (1,3,5-trimethylbenzene)
C. Toluene
D. Ethylbenzene

ANSWER B • Mesitylene (1,3,5-trimethylbenzene)
WHY Acid-catalyzed trimerization/dehydration of acetone can produce mesitylene.

143 / Q043 2022 • ADAPTED • ref Q9

The reaction $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ illustrates:

A. Combustion
B. Hydrolysis only
C. Neutralization / double displacement
D. Polymerization

ANSWER C • Neutralization / double displacement
WHY An acid and a base form salt and water through neutralization.

144 / Q044 2022 • ADAPTED • ref Q42

Which of the following is a monosaccharide?

A. Glucose
B. Cellulose
C. Starch
D. Sucrose

ANSWER A • Glucose
WHY Glucose is a single sugar unit; sucrose is a disaccharide and the others are polysaccharides.

145 / Q045 SEPARATE ADVANCED MOCK • ref Q112

Hydrolysis of an ester in alkali is effectively driven forward because the carboxylic acid product:

A. becomes an alkane
B. immediately reforms ester quantitatively
C. produces no alcohol
D. forms a resonance-stabilized carboxylate salt

ANSWER D • forms a resonance-stabilized carboxylate salt
WHY Alkaline hydrolysis creates stable carboxylate ion, suppressing the reverse esterification.

146 / Q046 2024 • MEMORY-BASED • ref Q33

Benzene diazonium chloride on treatment with Aniline gives:

A. p- Amino azobenzene
B. p- Hydroxy azobenzene
C. o- Amino azobenzene
D. p- Amino phenol

ANSWER A • p- Amino azobenzene
WHY Benzenediazonium couples with aniline to give chiefly para-aminoazobenzene under suitable conditions.

147 / Q047 EXPECTED • CEE-STYLE PRACTICE

Hydrolysis of an ester catalyzed by added H^+ ions is an example of:

A. Autocatalysis
B. Heterogeneous metal catalysis
C. Homogeneous acid catalysis
D. Enzyme inhibition

ANSWER C • Homogeneous acid catalysis
WHY H^+ and the reacting solution occupy the same liquid phase; this is homogeneous acid catalysis.

148 / Q048 2025 • MEMORY-BASED • ref Q13

Haloarene are less reactive than haloalkanes because of

A. Resonance
B. Mesomeric
C. Inductive effect
D. Hyperconjugation

ANSWER A • Resonance
WHY Resonance gives aryl C–halogen bonds partial double-bond character, reducing substitution reactivity.

149 / Q049 EXPECTED • CEE-STYLE PRACTICE

Which reagent converts a primary alcohol to an aldehyde without overoxidation under suitable conditions?

A. PCC
B. Excess acidified $KMnO_4$
C. NaOH
D. H_2/Ni

ANSWER A • PCC
WHY PCC is a selective mild oxidant for alcohol-to-carbonyl conversion.

150 / Q050 EXPECTED • CEE-STYLE PRACTICE

Adding a catalyst to a system already at equilibrium changes the equilibrium constant by:

A. Increasing it
B. Decreasing it
C. No change
D. Reversing its sign

ANSWER C • No change
WHY A catalyst accelerates both directions equally and does not shift equilibrium.

BOTANY / 20 QUESTIONS

151 / Q051 SEPARATE ADVANCED MOCK • ref Q44

A fungus obtains carbon from a living host and later produces resistant spores. Which observation best distinguishes it from a green plant?

A. Absorptive heterotrophy with chitinous wall
B. Multicellularity
C. Formation of spores
D. Presence of a cell wall

ANSWER A • Absorptive heterotrophy with chitinous wall
WHY A parasite gains nutrients from a host, which suffers the cost; this is not a discussion of antibiotic resistance.

152 / Q052 SEPARATE ADVANCED MOCK • ref Q64

A carrier female for an X-linked recessive trait mates with a normal male. Which child has the highest specified risk?

A. All sons: affected
B. Any daughter: 50% affected
C. Any son: 50% affected
D. All daughters: carriers

ANSWER C • Any son: 50% affected
WHY A carrier mother transmits the mutant X to half her sons; normal father gives sons a Y.

153 / Q053 2024 • MEMORY-BASED • ref Q6

All plants of a particular species living in a certain area at a given time is called:

A. Community
B. Vegetation
C. Population
D. Ecosystem

ANSWER C • Population
WHY Individuals of one species within one area at a given time constitute a population, not a community.

154 / Q054 2024 • MEMORY-BASED • ref Q31

The end product of oxidative phosphorylation is:

A. ATP and H_2O
B. ATP
C. $NADH_2$
D. ATP and $NADH_2$

ANSWER A • ATP and H_2O
WHY Electron transport establishes a proton gradient used for ATP synthesis; O_2 is reduced to H_2O.

155 / Q055 2024 • MEMORY-BASED • ref Q36

The transgenic plant which was developed to overcome Vitamin A deficiency is:

A. Triticale
B. Pomato
C. Golden rice
D. Bt cotton

ANSWER C • Golden rice
WHY Golden rice was engineered to produce provitamin A (β-carotene) in the edible endosperm.

156 / Q056 2023 • MEMORY-BASED • ref Q115

When radio labelled C-14 Uracil is incorporated in a sample, the molecular component that can be discovered is:

A. DNA
B. RNA
C. Histone
D. Nucleotide

ANSWER B • RNA
WHY Uracil is a nitrogenous base of RNA, whereas DNA ordinarily contains thymine.

157 / Q057 2023 • MEMORY-BASED • ref Q134

In tissue culture, explants are sterilized by:

A. By passing through filter membrane of pore size less than 0.2 microns
B. By passing UV light
C. Distillation
D. Sodium hypochlorite solution

ANSWER D • Sodium hypochlorite solution
WHY A dilute sodium hypochlorite solution surface-sterilizes explants to reduce microbial contamination.

158 / Q058 2025 • MEMORY-BASED • ref Q62

Which of the following is not anecploidy?

A. Downs syndrome
B. Turner's syndrome
C. Phenylketonuria
D. Khnfellers syndrome

ANSWER C • Phenylketonuria
WHY Phenylketonuria is a single-gene metabolic disease, not a chromosome-number abnormality.

159 / Q059 2025 • MEMORY-BASED • ref Q71

Phosphorylation means synthesis of

A. PGA
B. ADP and ATP
C. ATP from ADP
D. NADP

ANSWER C • ATP from ADP
WHY Phosphorylation adds phosphate to ADP to form ATP using an energy source.

160 / Q060 2025 • MEMORY-BASED • ref Q80

Dissolved oxygen in decreared in pond due to?

A. Biomagnification
B. Eutrophication
C. Nitrification
D. Denitrification

ANSWER B • Eutrophication
WHY Excess nutrients cause algal growth; decomposition consumes dissolved O_2 and may cause hypoxia.

161 / Q061 2022 • MEMORY-BASED • ref Q18

Which is correct in reference to cytokinin?

A. Internodal growth
B. Cell division
C. Root initiation
D. Cell elongation in shoot

ANSWER B • Cell division
WHY Cytokinins promote cell division and can influence shoot formation.

162 / Q062 SEPARATE ADVANCED MOCK • ref Q77

Removing anthers before dehiscence and then applying selected pollen is useful because it:

A. converts ovules into pollen
B. guarantees apomixis
C. prevents unwanted self-pollination while permitting controlled crossing
D. prevents fertilization completely

ANSWER C • prevents unwanted self-pollination while permitting controlled crossing
WHY Emasculation prevents self-pollination and permits intentional introduction of selected pollen.

163 / Q063 2023 • MEMORY-BASED • ref Q124

A bisexual, closed flower that remains closed throughout its life and sheds its pollen grains in closed condition 1s:

A. Chasmogamous
B. Homogamous
C. Cleistogamous
D. Dichogamous

ANSWER C • Cleistogamous
WHY Cleistogamous flowers stay closed and usually self-pollinate, maintaining reproductive assurance.

164 / Q064 2022 • ADAPTED • ref Q6

How are xylem and phloem typically arranged in a primary dicot root?

A. Conjoint
B. Radial
C. Bicollateral
D. Collateral

ANSWER B • Radial
WHY In roots xylem and phloem occupy alternate radii (radial vascular bundles).

165 / Q065 SEPARATE ADVANCED MOCK • ref Q46

Which evolutionary transition most reduced dependence of fertilization on external water?

A. Fragmentation in algae
B. Flagellated sperm in moss
C. Pollen formation in seed plants
D. Prothallus formation in fern

ANSWER C • Pollen formation in seed plants
WHY Pollen tubes allow sperm delivery without the external swimming water required in non-seed plants.

166 / Q066 SEPARATE ADVANCED MOCK • ref Q59

If mitochondrial inner membranes lose their proton gradient, the most direct consequence is reduced:

A. light absorption by chlorophyll
B. ATP synthesis by oxidative phosphorylation
C. DNA replication in nucleus
D. cellulose synthesis in wall

ANSWER B • ATP synthesis by oxidative phosphorylation
WHY Oxidative phosphorylation depends on the proton motive force across the mitochondrial inner membrane.

167 / Q067 2024 • MEMORY-BASED • ref Q7

Histone protein found in DNA is:

A. Basic
B. Acidic
C. Amphoteric
D. Neutral

ANSWER A • Basic
WHY Histones are positively charged basic proteins that bind negatively charged DNA.

168 / Q068 2024 • MEMORY-BASED • ref Q40

Maximum effect of genetic drift is seen in:

A. Slowly reproducing population
B. Small population
C. Large population
D. Rapidly growing population

ANSWER B • Small population
WHY Random allele-frequency changes are strongest in small populations.

169 / Q069 2023 • ADAPTED • ref Q133

Which soil bacterium is commonly engineered as a vector to deliver T-DNA into plant cells?

A. Bacillus subtilis
B. Escherichia coli only
C. Agrobacterium tumefaciens
D. Nitrosomonas

ANSWER C • Agrobacterium tumefaciens
WHY Agrobacterium transfers DNA through its modified Ti plasmid in many transformation protocols.

170 / Q070 2022 • ADAPTED • ref Q1

Where are ribosomal RNA and ribosomal subunits chiefly assembled in eukaryotic cells?

A. Nucleolus
B. Plasma membrane
C. Lysosome
D. Peroxisome

ANSWER A • Nucleolus
WHY The nucleolus is the major site of rRNA transcription and ribosomal assembly.

ZOOLOGY / 20 QUESTIONS

171 / Q071 2024 • ADAPTED • ref Q9

Which vertebra of a frog primarily articulates with the skull?

A. Atlas
B. Axis
C. Sacral vertebra
D. Urostyle

ANSWER A • Atlas
WHY The atlas is the first vertebra and supports the skull; frogs do not have six cervical vertebrae.

172 / Q072 2024 • MEMORY-BASED • ref Q31

Which of the following is not a bony fish?

A. Elasmobranchii
B. Teleostomi
C. Lung fishes
D. Coelocanths

ANSWER A • Elasmobranchii
WHY Elasmobranchii includes cartilaginous sharks and rays, whereas bony fishes belong to Osteichthyes.

173 / Q073 2023 • MEMORY-BASED • ref Q146

The terminal duct of septal nephridia of earthworm opens into

A. Intestine
B. Septal excretory duct
C. Paired supra intestinal excretory canal
D. Dorsal blood vessel

ANSWER B • Septal excretory duct
WHY Septal nephridia of earthworms discharge to the alimentary canal through ducts associated with septa.

174 / Q074 2025 • ADAPTED • ref Q101

The coelom of echinoderms originates during embryogenesis chiefly from:

A. Persistent blastocoel
B. Splitting of solid mesoderm
C. Outpocketings of the archenteron
D. Extracellular collagen

ANSWER C • Outpocketings of the archenteron
WHY Enterocoely occurs when archenteron pouches form mesoderm-lined cavities.

175 / Q075 2026 • MODEL PAPER

Pectoral fins of fish and forelimbs of horses illustrate:

A. Analogous organs
B. Homologous structures
C. Vestigial structures
D. Convergent mimicry

ANSWER B • Homologous structures
WHY They share a common evolutionary origin despite functional differences.

176 / Q076 SEPARATE ADVANCED MOCK • ref Q36

If helper T-cell numbers fall severely, both antibody and cell-mediated responses weaken because helper T cells:

A. form the skin barrier
B. coordinate activation of multiple immune cell types
C. carry oxygen to lymph nodes
D. directly secrete every antibody

ANSWER B • coordinate activation of multiple immune cell types
WHY Helper T cells activate and coordinate B cells, cytotoxic T cells and other immune responses.

177 / Q077 2024 • ADAPTED • ref Q8

Nocturnal itching around the anus in children most characteristically suggests infection by:

A. Taenia solium
B. Enterobius vermicularis
C. Ascaris lumbricoides
D. Wuchereria bancrofti

ANSWER B • Enterobius vermicularis
WHY Female pinworms deposit eggs around the anus at night, causing itching.

178 / Q078 2024 • MEMORY-BASED • ref Q18

The stage characterized by a vacuole at the center and nucleus at the periphery is:

A. Amoeboid stage
B. Signet ring stage
C. Schizont stage
D. Trophozoite

ANSWER B • Signet ring stage
WHY A central vacuole pushes the cytoplasm and nucleus to the edge, producing a signet-ring appearance.

179 / Q079 2024 • MEMORY-BASED • ref Q30

What is the primary function of smooth muscle?

A. Voluntary movement
B. Pumping of blood
C. Involuntary movement of hollow organs
D. Locomotion

ANSWER C • Involuntary movement of hollow organs
WHY Smooth muscle contracts involuntarily in organs such as gut, bladder, and blood vessels.

180 / Q080 2023 • ADAPTED • ref Q143

Which mammalian group generally lacks external ear pinnae?

A. Primates
B. Monotremes
C. Marsupials
D. Placental mammals

ANSWER B • Monotremes
WHY Monotremes such as platypuses lack prominent external pinnae.

181 / Q081 2023 • MEMORY-BASED • ref Q163

Areolar tissue is present in between:

A. Bone & fat body
B. Bone & muscle
C. Integument & muscle
D. Muscle & fat body

ANSWER C • Integument & muscle
WHY Areolar connective tissue binds skin and other tissues to underlying muscle and fills spaces.

182 / Q082 2023 • MEMORY-BASED • ref Q179

In which of the following types of symmetry a body can be divided into two roughly equal halves by any one of many vertical planes passing through the central axis?

A. Biradial symmetry
B. Radial symmetry
C. Bilateral symmetry
D. Asymmetry

ANSWER B • Radial symmetry
WHY Radial symmetry permits more than one longitudinal plane to divide the body into equivalent halves.

183 / Q083 2025 • MEMORY-BASED • ref Q105

Intraocular pressure is measure by?

A. Tonometer
B. Barometer
C. Sphygmomanoter
D. Spirometer

ANSWER A • Tonometer
WHY Tonometry measures intraocular pressure during assessment for glaucoma.

184 / Q084 2022 • ADAPTED • ref Q7

Marked deficiency of plasma albumin primarily increases risk of:

A. Oedema
B. Persistent hypertension
C. Polycythaemia
D. Hypercalcaemia

ANSWER A • Oedema
WHY Loss of plasma oncotic pressure allows more fluid to remain in interstitial tissues.

185 / Q085 2022 • ADAPTED • ref Q25

Among mammals, which living group is characterized by a placenta sustaining fetal exchange for a prolonged gestation?

A. Monotremes
B. Placental mammals (Eutheria)
C. Birds
D. Reptiles

ANSWER B • Placental mammals (Eutheria)
WHY Eutherians have a well-developed chorioallantoic placenta.

186 / Q086 2022 • MEMORY-BASED • ref Q36

Graafian follicle is present in

A. ovary of frog
B. _ testes of frog
C. testes of man
D. ovary of human

ANSWER D • ovary of human
WHY A mature Graafian follicle develops in the ovarian cortex.

187 / Q087 2024 • ADAPTED • ref Q10

Earthworms have a closed circulatory system. Which circulating fluid is found inside their blood vessels?

A. Haemolymph
B. Serum only
C. Blood
D. Coelomic fluid

ANSWER C • Blood
WHY Earthworms circulate blood in vessels; haemolymph is typical of many open circulatory systems.

188 / Q088 2024 • MEMORY-BASED • ref Q36

What happens to RBCs of humans in high altitude?

A. Increases in size
B. Increases in number
C. Decreases in size
D. Both a and b

ANSWER B • Increases in number
WHY Low oxygen at altitude stimulates erythropoietin release, increasing red-cell production over time.

189 / Q089 2023 • ADAPTED • ref Q162

Which human tongue papillae are mechanical and generally lack taste buds?

A. Foliate
B. Circumvallate
C. Fungiform
D. Filiform

ANSWER D • Filiform
WHY Filiform papillae have a mechanical role; foliate papillae may be reduced in adults.

190 / Q090 2025 • MEMORY-BASED • ref Q112

Which feature of the nephron allows formation of highly concentrated urine in mammals?

A. Less secretion of ADH
B. More no. of cortical nephron
C. Consumption of more pretein
D. More number of juxtamedullary nephrons

ANSWER D • More number of juxtamedullary nephrons
WHY Long loops of Henle in juxtamedullary nephrons generate a strong medullary osmotic gradient.

MENTAL AGILITY (MAT) / 10 QUESTIONS

191 / Q091 2023 • MEMORY-BASED • ref Q183

Out of 500 questions, a boy did 80% correct out of 250 questions he solved. How much % should be correct questions from remaining to get 60% overall?

A. 30%
B. 40%
C. 50%
D. 60%

ANSWER B • 40%
WHY He needs 300 correct of 500; 200 are already correct, so 100/250=40% of remaining questions.

192 / Q092 EXPECTED • CEE-STYLE PRACTICE

If a quantity is increased by 20% and then decreased by 20%, the net effect is:

A. No change
B. 4% decrease
C. 4% increase
D. 20% decrease

ANSWER B • 4% decrease
WHY $1.20 \times 0.80 = 0.96$ of the starting quantity.

193 / Q093 EXPECTED • CEE-STYLE PRACTICE

What comes next: 5, 10, 17, 26, 37, ?

A. 46
B. 48
C. 50
D. 52

ANSWER C • 50
WHY Successive differences increase by two: 5, 7, 9, 11, 13.

194 / Q094 EXPECTED • CEE-STYLE PRACTICE

No reptiles are mammals. All snakes are reptiles. Therefore:

A. All snakes are mammals
B. No snakes are mammals
C. Some snakes are mammals
D. All mammals are snakes

ANSWER B • No snakes are mammals
WHY Every snake falls inside the reptile class, disjoint from mammals.

195 / Q095 2024 • MEMORY-BASED • reformulated Q2

If 100 cats catch 100 mice in 100 days at a constant rate, how many days would 4 cats take to catch 4 mice?

A. 4
B. 25
C. 100
D. 400

ANSWER C • 100
WHY One cat catches one mouse in 100 days; the number of cats and mice scales equally.

196 / Q096 PYQ-DERIVED • CEE-STYLE PRACTICE

Six nurses can prepare 90 patient files in 5 hours at equal rates. How many files can four nurses prepare in 3 hours?

A. 24
B. 30
C. 36
D. 45

ANSWER C • 36
WHY A nurse handles 90/(6×5)=3 files per hour; 4×3×3=36.

197 / Q097 PYQ-DERIVED • CEE-STYLE PRACTICE

A medicine price rises by 25% and is then discounted by 20%. Compared with the initial price it is:

A. 5% higher
B. 5% lower
C. unchanged
D. 10% lower

ANSWER C • unchanged
WHY Successive factors 1.25×0.80=1; net change 0%.

198 / Q098 PYQ-DERIVED • CEE-STYLE PRACTICE

If NURSE is written as OVSTF (each letter shifted forward one place), DOCTOR becomes:

A. EPDUPS
B. EPDUTS
C. EPEUPS
D. DPCUPS

ANSWER A • EPDUPS
WHY D→E, O→P, C→D, T→U, O→P, R→S, giving EPDUPS.

199 / Q099 PYQ-DERIVED • CEE-STYLE PRACTICE

In a code, MED=22 and CAT=24 when the code equals the sum of alphabet positions. What is BED?

A. 10
B. 11
C. 12
D. 13

ANSWER B • 11
WHY B+E+D =2+5+4=11.

200 / Q100 PYQ-DERIVED • CEE-STYLE PRACTICE

Two fair dice are rolled. What is the probability of getting a total of 7?

A. 1/12
B. 1/9
C. 1/6
D. 1/3

ANSWER C • 1/6
WHY There are six ordered favorable outcomes among 36 equally likely outcomes: 6/36=1/6.

PYQ ANALYSIS PAPER 03

100 CEE MCQs • Four options • Answer and explanation after each question
PHYSICS 25 / CHEMISTRY 25 / BOTANY 20 / ZOOLOGY 20 / MAT 10
Source tag shown above every MCQ. "Advanced mock" and "model paper" labels do not indicate an official PYQ.

PHYSICS / 25 QUESTIONS

201 / Q001 SEPARATE ADVANCED MOCK • ref Q134

A satellite in a circular orbit is moved instantaneously to a larger circular orbit. Compared with the original orbit, its speed and total mechanical energy respectively:

A. increase; become less negative
B. decrease; become more negative
C. decrease; become less negative
D. increase; become more negative

ANSWER C • decrease; become less negative
WHY For circular motion $v = \sqrt{(GM/r)}$ and $E = -GMm/(2r)$; a larger radius gives lower speed but higher total energy.

202 / Q002 SEPARATE ADVANCED MOCK • ref Q146

[Numerical] An engine absorbs 600 J and rejects 360 J per cycle. Its efficiency is:

A. 1.67
B. 0.60
C. 0.24
D. 0.40

ANSWER D • 0.40
WHY Thermal efficiency $\eta = (Q_{in} - Q_{out})/Q_{in}$. Substitute the heat received and rejected.

203 / Q003 2024 • MEMORY-BASED • ref Q2

Two bodies of masses 4kg and 16 kg are moving with the same Kinetic Energy. What is the ratio of their momentum?

A. 1:2
B. 2:1
C. 4:1
D. 1:4

ANSWER A • 1:2
WHY For a fixed mass, $K = p^2/(2m)$; square-root or square relations are often tested.

204 / Q004 2024 • MEMORY-BASED • ref Q10

The ratio of mean value over half cycle to r.m.s value of A.C. is

A. 2:π
B. $2\sqrt{2}$:π
C. $\sqrt{2}$:π
D. $\sqrt{2}$:1

ANSWER B • $2\sqrt{2}$:π
WHY The half-cycle average is $2I_0/\pi$ and RMS is $I_0/\sqrt{2}$; their ratio equals $2\sqrt{2}/\pi$.

205 / Q005 2024 • MEMORY-BASED • ref Q27

The ratio of fundamental frequencies of a closed pipe and an open pipe of the same length is:

A. 1:2
B. 2:1
C. 4:1
D. 1:4

ANSWER A • 1:2
WHY Closed-pipe fundamental $f=v/(4L)$, open-pipe fundamental $f=v/(2L)$; ratio 1:2.

206 / Q006 2024 • MEMORY-BASED • ref Q47

In a container filled with N_2, H_2 and He gases, which has the maximum Kinetic Energy?

A. N_2
B. He
C. H_2
D. All have equal KE

ANSWER D • All have equal KE
WHY At one temperature, the mean translational molecular kinetic energy is 3kT/2 for every ideal gas.

207 / Q007 2025 • ADAPTED • ref Q176

The angle of an inclined plane with the horizontal at which a block just begins to slide is called:

A. Angle of reflection
B. Angle of repose
C. Angle of refraction
D. Angle of deviation

ANSWER B • Angle of repose
WHY At limiting friction, the angle of repose satisfies tan θ = μs.

208 / Q008 2022 • ADAPTED • ref Q26

Which logic gate produces HIGH output only when every input is LOW?

A. AND
B. OR
C. NOR
D. XOR

ANSWER C • NOR
WHY NOR is the negation of OR, so its output is 1 only for all-zero inputs.

209 / Q009 2021 • ADAPTED

A moving body of mass m sticks to an equal mass initially at rest. What fraction of the initial kinetic energy is lost?

A. One fourth
B. One half
C. Three fourths
D. None

ANSWER B • One half
WHY Final speed is v/2 by momentum conservation, leaving half of the starting kinetic energy.

210 / Q010 SEPARATE ADVANCED MOCK • ref Q132

Two projectiles are launched with equal speed at complementary angles. Ignoring air resistance, they have equal range. Which comparison is correct?

A. The larger-angle projectile has greater height and longer flight time
B. The smaller-angle projectile has greater height but shorter time
C. Their velocity vectors are identical at every instant
D. Equal maximum height and flight time

ANSWER A • The larger-angle projectile has greater height and longer flight time
WHY A projectile range is $R = u^2\sin(2\theta)/g$. Complementary angles θ and (90°−θ) give equal ranges.

211 / Q011 SEPARATE ADVANCED MOCK • ref Q163

Lenz law states that induced current opposes:

A. the magnetic field itself in every case
B. electric current in the source always
C. the change in magnetic flux producing it
D. motion regardless of flux change

ANSWER C • the change in magnetic flux producing it
WHY The negative sign in Faraday law, $\varepsilon = -d\Phi/dt$, expresses opposition to flux change.

212 / Q012 SEPARATE ADVANCED MOCK • ref Q168

Electric potential can be nonzero where electric field is zero, as illustrated by:

A. a point on an electric field line
B. every point near a single charge
C. the surface of an uncharged conductor only
D. the centre of a uniformly charged spherical shell

ANSWER D • the centre of a uniformly charged spherical shell
WHY Inside a uniformly charged thin shell E=0, but the potential is a constant generally not equal to zero.

213 / Q013 2024 • MEMORY-BASED • ref Q14

Two resistances R and 2R are connected across series. The heat developed across the resistances 2R and R will be in the ratio:

A. 1:2
B. 2:1
C. 4:1
D. 1:4

ANSWER B • 2:1
WHY Joule heating is $H = I^2Rt$; in a series circuit current is common.

214 / Q014 2022 • MEMORY-BASED • ref Q19

Highest magnetic permeability is

A. Ferromagnetic
B. Paramagnetic
C. Diamagnetic
D. None

ANSWER A • Ferromagnetic
WHY Ferromagnetic materials have very large positive relative magnetic permeability.

215 / Q015 SEPARATE ADVANCED MOCK • ref Q141

An ideal gas undergoes a complete cycle. Which quantity must be zero over the cycle?

A. Net work done
B. Net heat absorbed
C. Change in internal energy
D. Area enclosed on a P-V diagram

ANSWER C • Change in internal energy
WHY Internal energy is a state function. Its net change after one complete cycle is zero.

216 / Q016 2024 • ADAPTED • ref Q42

Which Carnot engine has the highest theoretical efficiency (hot source temperature T_h; cold sink temperature T_c)?

A. T_h = 100 K, T_c = 10 K
B. T_h = 300 K, T_c = 100 K
C. T_h = 600 K, T_c = 300 K
D. T_h = 600 K, T_c = 100 K

ANSWER A • T_h = 100 K, T_c = 10 K
WHY $\eta = 1 - T_c/T_h$. The first pair gives 90%, exceeding the other pairs.

217 / Q017 2022 • MEMORY-BASED • ref Q40

Isothermal process is that process with ..... constant

A. Temperature
B. Heat
C. Volume
D. Pressure

ANSWER A • Temperature
WHY In an isothermal change, temperature remains constant, though heat and work need not vanish.

218 / Q018 SEPARATE ADVANCED MOCK • ref Q153

A myopic eye is corrected with a concave lens because the lens:

A. increases focal power of the eye
B. converges rays more strongly
C. diverges incoming rays so the eye focuses them on retina
D. moves retina forward

ANSWER C • diverges incoming rays so the eye focuses them on retina
WHY For thin lenses, use 1/f = 1/v − 1/u with the chosen sign convention.

219 / Q019 2024 • ADAPTED • ref Q48

Electrons are accelerated through 5.2 kV before striking a metal target. What is the approximate shortest wavelength of the emitted X-rays?

A. 1.2 nm
B. 0.12 nm
C. 0.24 nm
D. 2.4 nm

ANSWER C • 0.24 nm
WHY Duane–Hunt law gives λmin = hc/eV = 1240/5200 nm ≈ 0.24 nm.

220 / Q020 SEPARATE ADVANCED MOCK • ref Q171

In Bohr model, an electron moving from n=3 to n=2 emits a photon whose energy equals:

A. E_3+E_2
B. E_3-E_2 in magnitude
C. E_2-E_3 with negative photon energy
D. the ionization energy from n=1

ANSWER B • E_3-E_2 in magnitude
WHY Bohr theory accurately describes hydrogen-like one-electron systems.

221 / Q021 2024 • MEMORY-BASED • ref Q19

The quark combination of proton is:

A. uud
B. udd
C. uuu
D. ddd

ANSWER A • uud
WHY A proton contains two up quarks and one down quark: uud.

222 / Q022 2023 • MEMORY-BASED • ref Q9

Which of the following determines saturation point for maximum photoelectric current?

A. Intensity
B. Stopping potential
C. Frequency
D. Wavelength

ANSWER A • Intensity
WHY Use Kmax = hf − φ; no electrons are emitted below the threshold frequency.

223 / Q023 EXPECTED • CEE-STYLE PRACTICE

Arrange these energy units from smallest to largest: electronvolt (eV), erg, joule (J), calorie (cal).

A. erg < eV < cal < J
B. eV < erg < J < cal
C. eV < J < erg < cal
D. J < erg < cal < eV

ANSWER B • eV < erg < J < cal
WHY 1 eV ≈ 1.60 × 10^{-19} J; 1 erg = 10^{-7} J; 1 cal ≈ 4.184 J.

224 / Q024 EXPECTED • CEE-STYLE PRACTICE

For a projectile, at the highest point the vertical component of velocity is:

A. Equal to initial velocity
B. Zero
C. Equal to horizontal velocity
D. Equal to g

ANSWER B • Zero
WHY Gravity reduces the vertical speed to zero at the apex, but horizontal speed persists.

225 / Q025 EXPECTED • CEE-STYLE PRACTICE

Two equal 6 Ω resistors in parallel have equivalent resistance:

A. 12 Ω
B. 6 Ω
C. 3 Ω
D. 1.5 Ω

ANSWER C • 3 Ω
WHY For two equal parallel resistors Req = R/2 = 3 Ω.

CHEMISTRY / 25 QUESTIONS

226 / Q026 SEPARATE ADVANCED MOCK • ref Q85

For a first-order reaction, doubling initial concentration while keeping temperature constant changes the half-life to:

A. four times
B. unchanged
C. twice
D. half

ANSWER B • unchanged
WHY After n half-lives the surviving amount equals $N_0(½)^n$.

227 / Q027 SEPARATE ADVANCED MOCK • ref Q93

For an exothermic equilibrium, raising temperature causes:

A. activation energy to become negative
B. K to decrease as equilibrium favors reactants
C. K to increase because collisions increase
D. K to remain constant at all temperatures

ANSWER B • K to decrease as equilibrium favors reactants
WHY Heating an exothermic equilibrium favors the endothermic reverse direction and lowers K.

228 / Q028 SEPARATE ADVANCED MOCK • ref Q116

During SN_1 substitution of a tertiary halide, rate depends mainly on:

A. both nucleophile and halide equally in one step
B. product concentration
C. halide concentration alone in the rate-determining ionization
D. nucleophile concentration only

ANSWER C • halide concentration alone in the rate-determining ionization
WHY In SN1, carbocation formation is slow; rate=k[alkyl halide] and nucleophile is absent from rate law.

229 / Q029 2024 • ADAPTED • ref Q (unit notation corrected)

The unit of rate constant in a third order reaction is:

A. mol L^{-1} s^{-1}
B. mol^2 L^{-2} s^{-1}
C. L^2 mol^{-2} s^{-1}
D. L mol^{-1} s^{-1}

ANSWER C • L^2 mol^{-2} s^{-1}
WHY For order three, k = rate/[concentration]³; units = L^2 mol^{-2} s^{-1}.

230 / Q030 2024 • MEMORY-BASED • ref Q48

At constant temperature, the rate of diffusion of a gas is:

A. Directly proportional to molecular weight
B. Inversely proportional to molecular weight
C. Directly proportional to square root of molecular weight
D. Inversely proportional to square root of molecular weight

ANSWER D • Inversely proportional to square root of molecular weight
WHY Graham law states rate ∝ 1/√M under comparable conditions.

231 / Q031 2025 • ADAPTED • ref Q24

Which one is typically classified as an amorphous form of carbon?

A. Graphite
B. Diamond
C. Fullerene crystal
D. Charcoal

ANSWER D • Charcoal
WHY Charcoal lacks long-range periodic crystal structure; graphite and diamond are crystalline.

232 / Q032 SEPARATE ADVANCED MOCK • ref Q82

A spontaneous process has ΔH>0. Which condition must make spontaneity possible?

A. Entropy of surroundings alone must rise while universe entropy falls
B. ΔS<0 at all temperatures
C. TΔS>ΔH with ΔS>0
D. ΔG>0

ANSWER C • TΔS>ΔH with ΔS>0
WHY Use ΔG = ΔH − TΔS. For an endothermic process to be spontaneous, TΔS must exceed ΔH.

233 / Q033 SEPARATE ADVANCED MOCK • ref Q94

A solution freezes below the pure solvent. For equal molalities, the greatest ideal depression is produced by:

A. urea
B. glucose
C. ethanol
D. NaCl (complete dissociation)

ANSWER D • NaCl (complete dissociation)
WHY Colligative freezing-point depression depends on total dissolved-particle concentration, including dissociation.

234 / Q034 SEPARATE ADVANCED MOCK • ref Q106

Among halide ions, reducing power in aqueous solution generally increases down the group because:

A. ionic radius decreases
B. larger ions lose electrons more readily despite hydration effects
C. all bond energies increase uniformly
D. electron affinity becomes infinitely large

ANSWER B • larger ions lose electrons more readily despite hydration effects
WHY Down Group 17 halide ions get larger and typically lose electrons more readily, increasing reducing power.

235 / Q035 SEPARATE ADVANCED MOCK • ref Q126

Ozone depletion by chlorofluorocarbons is catalytic because a chlorine radical:

A. adds ozone to make more ozone
B. acts only as greenhouse gas without reaction
C. is regenerated while converting ozone to oxygen
D. is permanently consumed in the first step

ANSWER C • is regenerated while converting ozone to oxygen
WHY Cl radicals are recycled in the reaction cycle, so one radical can destroy many ozone molecules.

236 / Q036 2024 • MEMORY-BASED • ref Q7

Which is the correct order for reactivity towards SN_1 reaction?

A. 1o>2o>3o
B. 2o>3o>1o
C. 3o>2o>1o
D. 1o>3o>2o

ANSWER C • 3o>2o>1o
WHY SN1 rate rises with carbocation stability: tertiary > secondary > primary.

237 / Q037 2024 • MEMORY-BASED • ref Q22

The donor atoms present in EDTA are:

A. 4 N and 2 O atoms
B. 4 O and 2 N atoms
C. 4 O and 4 N atoms
D. 2 O and 2 N atoms

ANSWER B • 4 O and 2 N atoms
WHY EDTA can coordinate through four carboxylate oxygen atoms and two nitrogen atoms (hexadentate).

238 / Q038 2024 • MEMORY-BASED • ref Q40

The conjugate base of HPO_4- - is:

A. H_2PO_4-
B. HPO_4-
C. PO_4- - -
D. H_3PO_4

ANSWER C • PO_4- - -
WHY Removing H^+ from hydrogen phosphate gives phosphate: $HPO_4^{2-} \rightarrow PO_4^{3-}$.

239 / Q039 2023 • MEMORY-BASED • ref Q55

Out of the following, which acid is strongest?

A. p-nitro phenol
B. o-nitro phenol
C. m-nitro phenol
D. o-amino phenol

ANSWER A • p-nitro phenol
WHY The nitro group withdraws electron density and stabilizes the phenoxide anion, increasing phenol acidity.

240 / Q040 2023 • MEMORY-BASED • ref Q76

Lower density of ice than water is due to

A. a cage like structure formed due to intermolecular H-bond
B. a cage like structure formed due to intramolecular H-bond
C. due to covalent bond
D. due to Van der Waals force

ANSWER A • a cage like structure formed due to intermolecular H-bond
WHY Open hydrogen-bonded tetrahedral arrangement spaces water molecules farther apart in ice.

241 / Q041 2023 • MEMORY-BASED • ref Q99

Which of the following favors the existence of substance in solid state?

A. High thermal energy
B. Low temperature
C. High temperature
D. Weak cohesive force

ANSWER B • Low temperature
WHY Low temperature reduces average molecular kinetic energy, favoring ordered condensed phases.

242 / Q042 2025 • ADAPTED • ref Q31

For the equilibrium A ⇌ B with 1:1 stoichiometry, if Kc = [B]/[A] = 2, then at equilibrium:

A. [B]=[A]
B. [B]=2[A]
C. [A]=2[B]
D. [B]=4[A]

ANSWER B • [B]=2[A]
WHY For this specified reaction, Kc = [B]/[A] = 2 directly determines the ratio.

243 / Q043 2022 • MEMORY-BASED • ref Q16

Yellow stain is developed while working with Nitric acid. It is due to presence of

A. Protein
B. Lipid
C. Fat
D. Carbohydrate

ANSWER A • Protein
WHY Nitric acid nitrates aromatic amino-acid residues in skin proteins, producing yellow coloration.

244 / Q044 2026 • MODEL PAPER

The approximate mass percentage of nitrogen in urea $CO(NH_2)_2$ is:

A. 18.7%
B. 46.7%
C. 60.0%
D. 72.0%

ANSWER B • 46.7%
WHY Nitrogen contributes 28 g to urea's 60 g molar mass: 46.7%.

245 / Q045 SEPARATE ADVANCED MOCK • ref Q119

Ethanal reacts with HCN to give a cyanohydrin. The carbonyl carbon is attacked because it is:

A. strongly nucleophilic
B. electron deficient due to C=O polarization
C. negatively charged in the reactant
D. aromatic

ANSWER B • electron deficient due to C=O polarization
WHY Polarized C=O has δ^+ carbon, which is attacked by nucleophilic CN^-.

246 / Q046 2024 • MEMORY-BASED • ref Q37

In Nitrobenzene, Nitro group ($-NO_2$) acts as:

A. o-directing group
B. m-directing group
C. o- and p- directing group
D. ring activating group

ANSWER B • m-directing group
WHY Electrophilic nitration of benzene proceeds through the nitronium ion NO_2^+.

247 / Q047 2023 • MEMORY-BASED • ref Q84

Phenol reacts with chloroform & NaOH to form

A. Salicylic acid
B. Salicaldehyde
C. Benzoic acid
D. Carbylamine

ANSWER B • Salicaldehyde
WHY Reimer–Tiemann reaction introduces –CHO mainly ortho to phenolic –OH, yielding salicylaldehyde.

248 / Q048 2025 • MEMORY-BASED • ref Q28

Preparation of aldehyde from acid chloride is known as;

A. Rosenmund's reduction
B. Cannizaro reaction
C. Perkins's condensation
D. Benzoin condensation

ANSWER A • Rosenmund's reduction
WHY Rosenmund reduction selectively converts acyl chlorides to aldehydes using poisoned Pd catalyst.

249 / Q049 EXPECTED • CEE-STYLE PRACTICE

The product of a typical aldol addition is:

A. α-hydroxy ketone
B. β-hydroxy carbonyl compound
C. Carboxylic acid only
D. Alkane

ANSWER B • β-hydroxy carbonyl compound
WHY Enolate attack on a carbonyl forms a β-hydroxy aldehyde or ketone.

250 / Q050 EXPECTED • CEE-STYLE PRACTICE

The hybridization of carbon in ethyne (C_2H_2) is:

A. sp^3
B. sp^2
C. sp
D. dsp^2

ANSWER C • sp
WHY Each carbon makes two sigma-bond directions and retains two p orbitals for π bonding.

BOTANY / 20 QUESTIONS

251 / Q051 SEPARATE ADVANCED MOCK • ref Q49

Lichens colonize bare rock successfully because the association combines:

A. fungal mineral/water retention with photosynthetic carbon gain
B. two autotrophs competing for light
C. a root and mycorrhiza of a vascular plant
D. a virus and bacterium

ANSWER A • fungal mineral/water retention with photosynthetic carbon gain
WHY In a lichen, fungus provides protection and mineral absorption while its photosynthetic partner supplies sugars.

252 / Q052 SEPARATE ADVANCED MOCK • ref Q67

A ring of bark is removed without damaging wood. Sugar accumulates above the ring while leaves initially remain hydrated. This demonstrates that:

A. phloem translocates organic solutes while xylem still carries water
B. both tissues were removed
C. transpiration stops immediately
D. xylem transports sugar downward

ANSWER A • phloem translocates organic solutes while xylem still carries water
WHY Girdling interrupts phloem sugar transport without immediately interrupting xylem water flow.

253 / Q053 2024 • MEMORY-BASED • ref Q26

The innermost layer of anther wall responsible for providing nutrition is termed as:

A. Endothecium
B. Tapetum
C. Exine
D. Intine

ANSWER B • Tapetum
WHY The tapetum is the nutritive innermost anther-wall layer supporting developing pollen.

254 / Q054 2024 • MEMORY-BASED • ref Q32

A normal man with a colourblind father married a normal woman with a colourblind mother. Then, what percentage of the sons will be colourblind?

A. 25%
B. 50%
C. 75%
D. 100%

ANSWER B • 50%
WHY The mother has an X-linked colorblindness allele from her affected mother and is a carrier. Each son has a 1/2 risk.

255 / Q055 2023 • MEMORY-BASED • ref Q103

Which one of the following has the least similar characters?

A. Family
B. Order
C. Genus
D. Class

ANSWER D • Class
WHY A class is a broad taxonomic rank containing many orders and therefore fewer shared traits than lower ranks.

256 / Q056 2023 • MEMORY-BASED • ref Q119

Bolting in plants is caused by-

A. Auxin
B. Ethylene
C. Gibberellins
D. Abscisic acid

ANSWER C • Gibberellins
WHY Gibberellins promote rapid stem elongation or bolting, particularly in many rosette plants.

257 / Q057 2023 • MEMORY-BASED • ref Q136

An interconnected food chain is:

A. Food web
B. Trophic level
C. Ecological Pyramid
D. Food Cycle

ANSWER A • Food web
WHY A food web connects several food chains and represents multiple pathways of energy transfer.

258 / Q058 2025 • MEMORY-BASED • ref Q63

Phenotypic and genotypic ratio is game in?

A. Codominance
B. Intermediate inheritance
C. Epistaxis
D. Linkage

ANSWER B • Intermediate inheritance
WHY Incomplete dominance in F_2 gives both genotype and phenotype ratios of 1:2:1.

259 / Q059 2025 • MEMORY-BASED • ref Q72

In the conversion of pyruvic acid to acetyl COA pyruvic acid is:

A. Denatured
B. Oxidized
C. Reduced
D. Isomerized

ANSWER B • Oxidized
WHY Pyruvate oxidation releases CO_2 and transfers electrons to NAD^+ while forming acetyl-CoA.

260 / Q060 2025 • ADAPTED • ref Q82

Why is the sickle-cell trait (HbAS) associated with protection against severe malaria in endemic regions?

A. The trait prevents mosquito bites
B. Heterozygote red cells can inhibit parasite survival
C. It guarantees lifelong immunity
D. It removes all red cells

ANSWER B • Heterozygote red cells can inhibit parasite survival
WHY Heterozygous sickle-cell trait provides partial protection, unlike a guarantee of immunity.

261 / Q061 2022 • ADAPTED • ref Q31

Agar is obtained primarily from members of which algal group?

A. Chlorophyta
B. Rhodophyta
C. Cyanobacteria
D. Euglenophyta

ANSWER B • Rhodophyta
WHY Red algae such as Gelidium and Gracilaria are major agar sources.

262 / Q062 2024 • MEMORY-BASED • ref Q2

Which hormone is responsible for rooting?

A. Auxin
B. Cytokinin
C. Gibberellin
D. Ethylene

ANSWER A • Auxin
WHY Auxins such as IBA and NAA promote adventitious root initiation in cuttings.

263 / Q063 2023 • MEMORY-BASED • ref Q137

Stilt roots in Sugarcane are developed from:

A. Lower internodes of stem
B. Lower nodes of stem
C. Radicle of seed
D. Aerial branches of stem

ANSWER B • Lower nodes of stem
WHY Maize and sugarcane develop supporting stilt roots from lower stem nodes.

264 / Q064 2022 • ADAPTED • ref Q8

Which type of mature xylem cell is living?

A. Tracheid
B. Vessel element
C. Xylem parenchyma
D. Xylem fiber

ANSWER C • Xylem parenchyma
WHY Most mature tracheids and vessel elements are dead; xylem parenchyma remains living.

265 / Q065 SEPARATE ADVANCED MOCK • ref Q50

In alternation of generations, meiosis directly produces:

A. gametes in all plants
B. a diploid zygote
C. haploid spores from diploid sporophyte cells
D. a multicellular sporophyte without mitosis

ANSWER C • haploid spores from diploid sporophyte cells
WHY Meiosis in the sporophyte produces haploid spores that grow into gametophytes.

266 / Q066 SEPARATE ADVANCED MOCK • ref Q63

A point mutation changes a codon but not its amino acid. This illustrates:

A. degeneracy of the genetic code
B. polyploidy
C. absence of translation
D. crossing over

ANSWER A • degeneracy of the genetic code
WHY The genetic code is degenerate, so some base substitutions leave the encoded amino acid unchanged.

267 / Q067 2024 • MEMORY-BASED • ref Q19

For a codon GUA in mRNA, the corresponding anticodon in tRNA will be:

A. GUC
B. CTU
C. CUA
D. CAU

ANSWER D • CAU
WHY The mRNA codon 5′-GUA-3′ pairs with the antiparallel tRNA anticodon 3′-CAU-5′.

268 / Q068 2023 • MEMORY-BASED • ref Q107

Which of the following syndromes is caused due to the present of an additional copy of the 18th chromosome ?

A. Patau's Syndrome
B. Down's Syndrome
C. Edward's Syndrome
D. Klinefelter's Syndrome

ANSWER C • Edward's Syndrome
WHY Edwards syndrome is trisomy 18: an extra copy of chromosome 18.

269 / Q069 2023 • MEMORY-BASED • ref Q135

The process of modification, manipulation and recombination of the DNA of an organism in order to introduce new traits into the organism is known as:

A. Genetic Engineering
B. Recombinant DNA technology
C. Gene mutation
D. Gene pooling

ANSWER A • Genetic Engineering
WHY Genetic engineering intentionally modifies or recombines DNA to change an organism’s traits.

270 / Q070 2022 • MEMORY-BASED • ref Q2

Nucleus has maximum size during

A. Prophase
B. Interphase
C. Metaphase
D. Anaphase

ANSWER B • Interphase
WHY The nucleus is generally prominent during interphase, when the nuclear envelope remains intact.

ZOOLOGY / 20 QUESTIONS

271 / Q071 2024 • ADAPTED • ref Q16

Which feature of a segmented triploblastic animal strongly supports classification as Arthropoda?

A. Paired wings in every species
B. Presence of antennae in all groups
C. Mouthparts in every species
D. Jointed appendages and a chitinous exoskeleton

ANSWER D • Jointed appendages and a chitinous exoskeleton
WHY Arthropods share segmented bodies, jointed appendages and chitinous cuticle.

272 / Q072 2024 • MEMORY-BASED • ref Q32

Classification of Protozoa is based on:

A. Shape
B. Number of nuclei
C. Locomotary organelles
D. Size

ANSWER C • Locomotary organelles
WHY Classical protozoan groups were differentiated partly by pseudopodia, cilia or flagella used in movement.

273 / Q073 2023 • MEMORY-BASED • ref Q148

Which one of the following laryngotracheal cartilage are present in frog?

A. 1 arytenoid & 2 cricoid
B. 2 arytenoid & 1 cricoid
C. 1 enicoid & 1 arytenoid
D. 2 cricoid & 2 arytenoid

ANSWER B • 2 arytenoid & 1 cricoid
WHY Frog laryngeal cartilages include paired arytenoids and a cricoid support.

274 / Q074 2025 • MEMORY-BASED • ref Q107

What is the grinding organ in earthworm?

A. Gizzard
B. Pharynx
C. Stomach
D. Intestine

ANSWER A • Gizzard
WHY The muscular gizzard mechanically grinds soil and organic material in an earthworm.

275 / Q075 2026 • MODEL PAPER

Which electric fish is a classical example of a strongly bioelectric ray?

A. Torpedo
B. Rohu
C. Labeo
D. Hippocampus

ANSWER A • Torpedo
WHY Electric rays such as Torpedo possess modified muscle-derived electric organs.

276 / Q076 SEPARATE ADVANCED MOCK • ref Q38

In DNA fingerprinting, two samples matching at many variable loci are more informative than matching at one locus because:

A. one locus contains the entire genome
B. all humans differ at every locus
C. each additional independent match reduces chance coincidence
D. matching proves the samples are from different people

ANSWER C • each additional independent match reduces chance coincidence
WHY Matching more independent variable DNA loci sharply decreases the likelihood of coincidental similarity.

277 / Q077 2024 • ADAPTED • ref Q11

Which tissue stores triglycerides and reduces heat loss by insulation?

A. Nervous tissue
B. Adipose tissue
C. Skeletal muscle
D. Hyaline cartilage

ANSWER B • Adipose tissue
WHY Adipocytes store fat and provide thermal insulation.

278 / Q078 2024 • ADAPTED • ref Q19

Which glandular secretion involves complete breakdown of the secretory cell?

A. Merocrine
B. Apocrine
C. Holocrine
D. Endocrine

ANSWER C • Holocrine
WHY Holocrine secretion releases product when secretory cells disintegrate; sebaceous glands are examples.

279 / Q079 2024 • MEMORY-BASED • ref Q37

Which of the following is the major function of Vitamin C?

A. Acts as Antioxidant
B. Clotting of blood
C. Repair of epithelial tissues
D. Growth and development

ANSWER A • Acts as Antioxidant
WHY Vitamin C is a water-soluble antioxidant and a cofactor for collagen synthesis.

280 / Q080 2023 • MEMORY-BASED • ref Q145

When walking in water a person gets infected with a parasite which can penetrate through skin. The parasite is:

A. Ancylostoma
B. Wuchereria
C. Schistosoma
D. Trypanosoma

ANSWER A • Ancylostoma
WHY Hookworm (Ancylostoma) larvae can actively penetrate skin and establish intestinal infection.

281 / Q081 2023 • MEMORY-BASED • ref Q166

Which of the following protects body?

A. Epithelial tissue
B. Connective tissue
C. Nervous tissue
D. Muscular tissue

ANSWER A • Epithelial tissue
WHY Epithelium covers body surfaces and lines cavities, forming a physical protective barrier.

282 / Q082 2023 • MEMORY-BASED • ref Q180

The metal present in vitamin B_{12} is

A. Ferrous
B. Zinc
C. Copper
D. Cobalt

ANSWER D • Cobalt
WHY Vitamin B_{12} supports normal DNA synthesis during red-cell maturation.

283 / Q083 2025 • MEMORY-BASED • ref Q108

Recapitulation theory is proposed by

A. E.P odwn
B. Ernst Haeckel
C. AG. Tansigy
D. Linnaeous

ANSWER B • Ernst Haeckel
WHY Ernst Haeckel proposed the historical recapitulation theory (“ontogeny recapitulates phylogeny”).

284 / Q084 2022 • MEMORY-BASED • ref Q12

Which is homologous to penis in female?

A. Labia majora
B. Labia minora 23
C. Clitoris
D. Vulva

ANSWER C • Clitoris
WHY The clitoris and penis arise from homologous embryonic genital tissues.

285 / Q085 2022 • ADAPTED • ref Q26

The main central regulator of mammalian body temperature is the:

A. Cerebellum
B. Medulla only
C. Hypothalamus
D. Spinal cord

ANSWER C • Hypothalamus
WHY The hypothalamus integrates thermal afferents and effector responses.

286 / Q086 SEPARATE ADVANCED MOCK • ref Q31

A man produces normal testosterone but sperm fail to mature because epididymal function is lost. Which conclusion follows?

A. Androgen production and sperm maturation are distinct functions
B. Testosterone is made only in epididymis
C. Fertilization normally occurs in seminiferous tubules
D. Spermatogenesis occurs in prostate

ANSWER A • Androgen production and sperm maturation are distinct functions
WHY Leydig cells make testosterone while the epididymis supports sperm maturation and storage.

287 / Q087 2024 • MEMORY-BASED • ref Q12

Which of the following is a sexually transmitted disease?

A. Hepatitis A
B. Hepatitis B
C. Hepatitis C
D. Hepatitis D

ANSWER B • Hepatitis B
WHY Hepatitis B can be transmitted through sexual contact and infected blood.

288 / Q088 2024 • MEMORY-BASED • ref Q38

Which of the following sets of diseases is caused by virus?

A. Typhoid, Cholera
B. AIDS, Tuberculosis
C. Mumps, AIDS
D. Measles, Tetanus

ANSWER C • Mumps, AIDS
WHY Mumps and AIDS are caused by viruses; tuberculosis and cholera are bacterial.

289 / Q089 2023 • MEMORY-BASED • ref Q169

Which of the following hormone helps in embryo attachment?

A. Estrogen
B. Progesterone
C. FSH
D. Prolactin

ANSWER B • Progesterone
WHY Progesterone maintains the secretory endometrium, facilitating implantation.

290 / Q090 2022 • ADAPTED • ref Q1

Which blood group is the usual universal donor for red blood cells (with compatibility testing still required)?

A. O Rh-negative
B. AB Rh-positive
C. A Rh-positive
D. B Rh-positive

ANSWER A • O Rh-negative
WHY O-negative RBCs lack A, B and Rh(D) antigens; blood compatibility testing remains essential.

MENTAL AGILITY (MAT) / 10 QUESTIONS

291 / Q091 EXPECTED • CEE-STYLE PRACTICE

Four boxes are stacked vertically. Fruit is above salad; snack is below salad; vegetable is above fruit. Which is necessarily the top box?

A. Snack
B. Vegetable
C. Salad
D. Fruit

ANSWER B • Vegetable
WHY Ordering vegetable > fruit > salad > snack places vegetables at the top.

292 / Q092 EXPECTED • CEE-STYLE PRACTICE

A train moves at 72 km/h. How far does it travel in 15 seconds?

A. 150 m
B. 200 m
C. 250 m
D. 300 m

ANSWER D • 300 m
WHY 72 km/h = 20 m/s; distance = 20 × 15 = 300 m.

293 / Q093 EXPECTED • CEE-STYLE PRACTICE

Find the next number: 2, 3, 5, 8, 12, 17, ?

A. 21
B. 22
C. 23
D. 24

ANSWER C • 23
WHY Consecutive differences are 1, 2, 3, 4, 5, then 6.

294 / Q094 EXPECTED • CEE-STYLE PRACTICE

A is north of B, and B is east of C. Relative to C, A is:

A. Northwest
B. Northeast
C. Southwest
D. Southeast

ANSWER B • Northeast
WHY Move east from C to B and then north to A.

295 / Q095 2024 • MEMORY-BASED • reformulated Q3

Two trains of lengths 80 m and 100 m move in the same direction at 51 m/s and 42 m/s. How long does the faster train take to completely overtake the slower one?

A. 9 s
B. 18 s
C. 20 s
D. 36 s

ANSWER C • 20 s
WHY Total relative distance = 180 m; relative speed = 9 m/s; time = 20 s.

296 / Q096 PYQ-DERIVED • CEE-STYLE PRACTICE

Two workers finish a job in 12 and 18 days separately. Working together, they finish it in:

A. 6 days
B. 7 1/5 days
C. 8 days
D. 15 days

ANSWER B • 7 1/5 days
WHY Rates add: 1/12+1/18=5/36, so time =36/5=7.2 days.

297 / Q097 PYQ-DERIVED • CEE-STYLE PRACTICE

A sample is diluted in the ratio 2:3 of concentrate to water. In 250 mL of mixture, how much concentrate is present?

A. 75 mL
B. 100 mL
C. 125 mL
D. 150 mL

ANSWER B • 100 mL
WHY The concentrate fraction is 2/(2+3)=2/5; 2/5×250=100 mL.

298 / Q098 PYQ-DERIVED • CEE-STYLE PRACTICE

In an alphabet code A=1, B=2, ..., Z=26, what is the sum of letters in CEE?

A. 11
B. 12
C. 13
D. 14

ANSWER C • 13
WHY C=3 and E=5, so 3+5+5=13.

299 / Q099 PYQ-DERIVED • CEE-STYLE PRACTICE

A is older than B. C is younger than B. D is older than A. Who is certainly the oldest?

A. A
B. B
C. C
D. D

ANSWER D • D
WHY The ordering is D>A>B>C.

300 / Q100 PYQ-DERIVED • CEE-STYLE PRACTICE

A test has 20 items. Correct answers earn +1 and wrong answers −0.25. If 16 are correct and 4 wrong, the net score is:

A. 14
B. 15
C. 15.5
D. 16

ANSWER B • 15
WHY Score =16−4×0.25=15.

PYQ ANALYSIS PAPER 04

100 CEE MCQs • Four options • Answer and explanation after each question
PHYSICS 25 / CHEMISTRY 25 / BOTANY 20 / ZOOLOGY 20 / MAT 10
Source tag shown above every MCQ. "Advanced mock" and "model paper" labels do not indicate an official PYQ.

PHYSICS / 25 QUESTIONS

301 / Q001 SEPARATE ADVANCED MOCK • ref Q135

[Numerical] A car travels half a distance at speed v and the other half at 2v. Its average speed is:

A. √2v
B. 4v/3
C. 3v/2
D. 5v/4

ANSWER B • 4v/3
WHY For equal out-and-back distances use the harmonic mean 2uv/(u+v), not the arithmetic mean.

302 / Q002 SEPARATE ADVANCED MOCK • ref Q177

In β− decay, conservation laws require emission of an electron and:

A. a neutrino with zero role
B. a proton only
C. an antineutrino
D. an alpha particle

ANSWER C • an antineutrino
WHY β^- decay transforms $n \rightarrow p + e^- +$ anti-ν_e, conserving lepton number and energy.

303 / Q003 2024 • MEMORY-BASED • ref Q3

A sphere floats with half its volume in mercury (13.6 g/cm³) and half in oil (0.8 g/cm³). Find the sphere density.

A. 5.2
B. 6.8
C. 7.2 g/cm³
D. 12.8

ANSWER C • 7.2 g/cm³
WHY By buoyancy, $\rho_{sphere} = (13.6 + 0.8)/2 = 7.2$ g/cm³.

304 / Q004 2024 • MEMORY-BASED • ref Q17

A galaxy is receding with velocity 1330 km/s. If the Hubble's constant is 70 km/s/Mpc, find the distance of the galaxy from the Earth

A. 93100 Mpc
B. 18 Mpc
C. 19 Mpc
D. 1330 Mpc

ANSWER C • 19 Mpc
WHY Hubble law is $v = H_0 d$, so $d = v/H_0$.

305 / Q005 2024 • MEMORY-BASED • ref Q29

Which of the following has maximum penetrating power?

A. α rays
B. β rays
C. γ rays
D. X- rays

ANSWER C • γ rays
WHY Gamma radiation is high-frequency electromagnetic radiation and generally penetrates more than α or β.

306 / Q006 2023 • MEMORY-BASED • ref Q4

The escape velocity from earth is 11 km/s . If a body is to be projected in a direction making an angle of 45° to the vertical, then the escape velocity is

A. 11 km/s
B. 22 km/s
C. 44 km/s
D. 33 km's

ANSWER A • 11 km/s
WHY Escape speed follows $v_e = \sqrt{(2GM/R)}$; it is independent of launch direction.

307 / Q007 2025 • MEMORY-BASED • ref Q177

If the speed of rotation of the Earth increases, then the weight of a body:

A. Decreases
B. May increases or decreases
C. Remains unchanged
D. Increases

ANSWER A • Decreases
WHY Faster rotation increases the outward centrifugal term, reducing apparent gravitational weight (except at poles).

308 / Q008 2022 • ADAPTED • ref Q30

What is the approximate half-life of carbon-14?

A. 5,390 years
B. 5,730 years
C. 500 years
D. 57,300 years

ANSWER B • 5,730 years
WHY Radiocarbon dating uses a ^{14}C half-life of about 5,730 years.

309 / Q009 2021 • ADAPTED

Which best describes uniform circular motion?

A. Simple harmonic and nonperiodic
B. Periodic but not SHM
C. Neither periodic nor accelerated
D. Uniform velocity

ANSWER B • Periodic but not SHM
WHY The velocity direction continually changes; circular motion repeats but is not itself SHM.

310 / Q010 SEPARATE ADVANCED MOCK • ref Q137

A ball is thrown vertically upward inside a lift accelerating upward. Relative to the lift, and ignoring air resistance, the ball has:

A. downward acceleration g+a
B. downward acceleration smaller than g
C. zero acceleration at the top
D. upward acceleration a

ANSWER A • downward acceleration g+a
WHY In an upward-accelerating lift, effective downward acceleration is g+a; apply kinematics in the accelerating frame.

311 / Q011 SEPARATE ADVANCED MOCK • ref Q164

A transformer cannot operate with steady DC because steady DC produces:

A. a changing flux of constant rate
B. no continuously changing magnetic flux
C. infinite secondary voltage
D. zero primary current

ANSWER B • no continuously changing magnetic flux
WHY A transformer requires time-varying magnetic flux: $\varepsilon_s = -N_s \, d\Phi/dt$.

312 / Q012 SEPARATE ADVANCED MOCK • ref Q173

A p-n junction under forward bias has reduced barrier potential, so its current:

A. decreases below reverse saturation current
B. remains exactly zero
C. flows without charge carriers
D. increases strongly after threshold

ANSWER D • increases strongly after threshold
WHY Forward bias lowers the depletion barrier and enables majority carriers to cross, raising current.

313 / Q013 2024 • ADAPTED • ref Q24

Five identical 5 μF capacitors are connected in series. What is their equivalent capacitance?

A. 0.2 μF
B. 0.5 μF
C. 1 μF
D. 25 μF

ANSWER C • 1 μF
WHY For n identical capacitors in series, $C_eq = C/n = 5/5 = 1$ μF.

314 / Q014 2022 • MEMORY-BASED • ref Q20

An electrons enters in uniform magnetic field ‘B' with velocity 'V', if V and B are parallel with each then which is correct for path of electrons?

A. Circular track
B. Parabolic path
C. Moves perpendicular to magnetic field AME
D. No change in orientation

ANSWER D • No change in orientation
WHY When v ∥ B, v×B=0; the electron continues in a straight line without magnetic deflection.

315 / Q015 SEPARATE ADVANCED MOCK • ref Q142

A metal ring is heated uniformly. Its central hole:

A. expands as if the missing material also expanded
B. remains unchanged
C. contracts because material expands inward
D. first closes and then opens

ANSWER A • expands as if the missing material also expanded
WHY Every linear dimension of a uniformly heated ring expands, including its central opening.

316 / Q016 2024 • MEMORY-BASED • ref Q46

For a temperature increase of 1 K, the velocity of sound in air increases by:

A. 0.4 m/s
B. 0.5 m/s
C. 0.6 m/s
D. 1 m/s

ANSWER C • 0.6 m/s
WHY Near room temperature speed of sound in air changes by about 0.6 m/s per kelvin.

317 / Q017 2026 • MODEL PAPER

For an ideal gas in an isothermal process, internal energy change equals:

A. nRT
B. Zero
C. Work input
D. Heat loss

ANSWER B • Zero
WHY Ideal-gas internal energy depends only on temperature, which remains constant.

318 / Q018 SEPARATE ADVANCED MOCK • ref Q155

Total internal reflection occurs only when light travels:

A. from vacuum to glass normally
B. from denser to rarer with incidence above critical angle
C. through a thin lens
D. from rarer to denser at any angle

ANSWER B • from denser to rarer with incidence above critical angle
WHY Total internal reflection requires travel from higher to lower refractive index and $i > i_c$.

319 / Q019 2023 • MEMORY-BASED • ref Q30

Refractive index doesn't depend on:

A. Temperature
B. Intensity
C. Wavelength
D. Optical density

ANSWER B • Intensity
WHY For thin lenses, use $1/f = 1/v - 1/u$ with the chosen sign convention.

320 / Q020 SEPARATE ADVANCED MOCK • ref Q172

An electron and a proton have equal de Broglie wavelength. They must have equal:

A. speed
B. mass
C. momentum magnitude
D. kinetic energy

ANSWER C • momentum magnitude
WHY de Broglie relation $\lambda = h/p$; equal wavelength means equal momentum magnitude.

321 / Q021 2024 • MEMORY-BASED • ref Q20

A p-type semiconductor is made by doping an intrinsic semiconductor with acceptor material. Which of the following can be used to convert Germanium into a p-type semiconductor?

A. Antimony
B. Phosphorus
C. Silicon
D. Indium

ANSWER D • Indium
WHY Group-13 indium contributes acceptor levels (holes) when substituted into group-14 germanium.

322 / Q022 2023 • ADAPTED • ref Q11

An antineutron contains which valence antiquark combination?

A. $\bar{u}\bar{u}\,\bar{d}$
B. $\bar{u}\,\bar{d}\,\bar{d}$
C. u d d
D. $\bar{u}$ d d

ANSWER B • $\bar{u}\,\bar{d}\,\bar{d}$
WHY A neutron has udd valence quarks; the antineutron has their corresponding antiquarks.

323 / Q023 2022 • MEMORY-BASED • ref Q18

A proton and electron is moving in a uniform magnetic field with same KE then which is correct?

A. Path of electron is less curved
B. Path of proton is less curved
C. Both equally curved
D. None

ANSWER B • Path of proton is less curved
WHY For equal K, $p = \sqrt{(2mK)}$ and $r = p/(|q|B)$. A proton has larger radius, hence less curvature.

324 / Q024 EXPECTED • CEE-STYLE PRACTICE

In steady incompressible flow through a narrower horizontal pipe section, fluid speed:

A. Decreases
B. Increases
C. Becomes zero
D. Remains fixed

ANSWER B • Increases
WHY Continuity A v = constant makes speed larger in a narrower tube.

325 / Q025 EXPECTED • CEE-STYLE PRACTICE

The energy stored in a capacitor is:

A. CV
B. CV^2
C. $CV^2/2$
D. C/V

ANSWER C • $CV^2/2$
WHY $U = 1/2\ CV^2$ for a capacitor charged to potential V.

CHEMISTRY / 25 QUESTIONS

326 / Q026 SEPARATE ADVANCED MOCK • ref Q87

A gas expands freely into vacuum in an insulated vessel. For an ideal gas, which set is correct?

A. $q=0, w<0, \Delta T>0$
B. $q>0, w<0, \Delta U=0$
C. $q=0, w=0, \Delta U=0$
D. $q<0, w=0, \Delta U<0$

ANSWER C • $q=0, w=0, \Delta U=0$
WHY In free expansion against vacuum w = 0. If insulated, q = 0; for an ideal gas $\Delta U = 0$.

327 / Q027 SEPARATE ADVANCED MOCK • ref Q95

In electrolysis of aqueous $CuSO_4$ using inert electrodes, Cu deposits preferentially at the cathode because:

A. the cathode oxidizes Cu^{2+}
B. copper atoms are negatively charged
C. sulfate is reduced first
D. Cu^{2+} reduction is favored over water reduction under the stated conditions

ANSWER D • Cu^{2+} reduction is favored over water reduction under the stated conditions
WHY At the cathode under ordinary aqueous conditions, Cu^{2+} gains electrons more readily than water does.

328 / Q028 SEPARATE ADVANCED MOCK • ref Q117

A primary alkyl halide with a strong nucleophile favors SN_2 because:

A. steric crowding accelerates attack
B. backside attack can occur with low steric hindrance
C. a primary carbocation is highly stable
D. reaction proceeds through two carbocations

ANSWER B • backside attack can occur with low steric hindrance
WHY A primary substrate is less sterically hindered, allowing one-step backside nucleophilic attack.

329 / Q029 2024 • MEMORY-BASED • ref Q28

Graphite is used in nuclear reactors as:

A. Lubricant
B. To reduce neutron velocity
C. Superconductor
D. To control the number of neutrons

ANSWER B • To reduce neutron velocity
WHY Graphite slows fast neutrons (moderates them) without absorbing too many neutrons.

330 / Q030 2023 • MEMORY-BASED • ref Q73

The pH of 0.2% (w/V) NaOH will be

A. 12.7
B. 12.3
C. 13.7
D. 13.3

ANSWER A • 12.7
WHY 0.2 g NaOH per 100 mL is 2 g/L =0.05 M; pOH≈1.30, pH≈12.70.

331 / Q031 2022 • ADAPTED • ref Q26

Electric current in an aqueous electrolyte is carried mainly by the movement of:

A. Electrons through solution only
B. Ions
C. Photons
D. Neutrons

ANSWER B • Ions
WHY Positive and negative ions transport charge through an electrolyte.

332 / Q032 SEPARATE ADVANCED MOCK • ref Q84

A weak acid HA is half-neutralized by strong base. Neglecting activity effects, which relation holds?

A. pH=pKa because [HA]=[A−]
B. Ka=0
C. pH=7 always
D. [H+]=initial acid concentration

ANSWER A • pH=pKa because [HA]=[A−]
WHY Henderson–Hasselbalch gives pH = pKa + log([A⁻]/[HA]); at half neutralization the ratio is 1.

333 / Q033 SEPARATE ADVANCED MOCK • ref Q99

Across a period, oxide character generally changes from basic to acidic because:

A. metallic character decreases and electronegativity increases
B. atomic size always increases
C. all oxides become ionic
D. oxidation states become zero

ANSWER A • metallic character decreases and electronegativity increases
WHY Across a period metallic character falls, so oxides generally become more acidic.

334 / Q034 SEPARATE ADVANCED MOCK • ref Q107

Temporary hardness is removed by boiling because bicarbonates decompose to:

A. metal atoms
B. insoluble carbonates with CO_2 and water
C. nitrates
D. soluble chlorides

ANSWER B • insoluble carbonates with CO_2 and water
WHY Boiling decomposes Ca/Mg bicarbonates, precipitating poorly soluble carbonates or hydroxides.

335 / Q035 SEPARATE ADVANCED MOCK • ref Q130

A precipitate is washed before gravimetric weighing mainly to:

A. add indicator color
B. remove soluble adhering impurities without dissolving appreciable precipitate
C. increase its unknown composition
D. convert it completely to filtrate

ANSWER B • remove soluble adhering impurities without dissolving appreciable precipitate
WHY Washing removes soluble contaminants while preserving the weighed precipitate.

336 / Q036 2024 • MEMORY-BASED • ref Q8

What is the stereochemistry of the product in SN_2 reaction?

A. Retention
B. Racemisation
C. Walden Inversion
D. Net Inversion

ANSWER C • Walden Inversion
WHY Backside attack in SN2 causes inversion of configuration at a stereogenic reaction center.

337 / Q037 2024 • MEMORY-BASED • ref Q23

Activation energy of a reaction can be decreased by:

A. Adding reactants
B. Using Catalyst
C. Increasing the temperature
D. All of the above

ANSWER B • Using Catalyst
WHY A catalyst offers an alternative pathway with lower activation energy without changing ΔG of reaction.

338 / Q038 2024 • ADAPTED • ref Q41

In Fischer esterification, a carboxylic acid reacts with an alcohol (H^+, heat) to form:

A. A primary amine
B. An ether
C. An ester
D. An alkene

ANSWER C • An ester
WHY Acid-catalyzed condensation forms an ester and water.

339 / Q039 2023 • MEMORY-BASED • ref Q61

Removal of oxygen is known as

A. Reduction
B. Oxidation
C. Hydration
D. Dehydrogenation

ANSWER A • Reduction
WHY Reduction can be expressed as oxygen removal, hydrogen addition, or electron gain.

340 / Q040 EXPECTED • CEE-STYLE PRACTICE

Which common metal is liquid at room temperature and has a high density?

A. Aluminium
B. Mercury
C. Sodium
D. Zinc

ANSWER B • Mercury
WHY Mercury is liquid at room temperature and has a density near 13.6 g/cm^3.

341 / Q041 2023 • MEMORY-BASED • ref Q100

Oil of Mirbane is the common name for

A. Nitrobenzene
B. Methyl salicylate
C. Ethyl salicylate
D. Benzaldehyde

ANSWER A • Nitrobenzene
WHY Oil of mirbane is the traditional common name for nitrobenzene.

342 / Q042 2025 • ADAPTED • ref Q32

Which transition-metal compound is used with trialkylaluminium in a classical Ziegler–Natta polymerization catalyst?

A. $CdCl_2$
B. $TiCl_4$
C. NaCl
D. $CaCO_3$

ANSWER B • $TiCl_4$
WHY Classical catalysts use titanium chlorides with organoaluminium co-catalysts.

343 / Q043 2022 • MEMORY-BASED • ref Q21

For the production of H_2S in lab we use

A. Kipp's apparatus
B. Haber's process
C. Contact process
D. Castner's process 3

ANSWER A • Kipp's apparatus
WHY Kipp apparatus permits controlled preparation of gases such as H_2S from suitable solids and acids.

344 / Q044 2026 • MODEL PAPER

The 4p orbital begins to fill after which subshell in the ground-state Aufbau order?

A. 4d
B. 5s
C. 4f
D. 3d

ANSWER D • 3d
WHY The usual sequence is 4s → 3d → 4p.

345 / Q045 SEPARATE ADVANCED MOCK • ref Q122

Glucose gives a positive reducing-sugar test despite being predominantly cyclic because:

A. it contains a ketone only and never opens
B. the test hydrolyses it to methane
C. all alcohols reduce Cu^{2+} identically
D. its ring can equilibrate with an open-chain aldehyde form

ANSWER D • its ring can equilibrate with an open-chain aldehyde form
WHY The open-chain aldehyde form remains in equilibrium with cyclic glucose, enabling its reducing-sugar reactions.

346 / Q046 2024 • MEMORY-BASED • ref Q43

When phenol reacts with excess Bromine, the product obtained is:

A. o- Bromophenol
B. m- Bromophenol
C. o, p- dibromophenol
D. Tribromophenol

ANSWER D • Tribromophenol
WHY Activated phenol reacts with excess bromine water to give 2,4,6-tribromophenol.

347 / Q047 2023 • MEMORY-BASED • ref Q98

Lindlar's catalyst helps in the conversion of alkyne to

A. Trans alkene
B. Cis alkene
C. Alkane
D. Cycloalkane

ANSWER B • Cis alkene
WHY Lindlar catalyst selectively hydrogenates alkynes to cis-alkenes.

348 / Q048 2022 • ADAPTED • ref Q8

Why is ozone used in water treatment?

A. To remove Ca^{2+} hardness selectively
B. To make water more radioactive
C. To add chloride
D. To disinfect by oxidative destruction of microorganisms

ANSWER D • To disinfect by oxidative destruction of microorganisms
WHY Ozone is an oxidizing disinfectant; this is called ozonation, not ozonolysis.

349 / Q049 EXPECTED • CEE-STYLE PRACTICE

Aromatic nitration of benzene principally involves which electrophile?

A. NO_2^+
B. NO_3^-
C. NH_4^+
D. OH^-

ANSWER A • NO_2^+
WHY Nitronium ion attacks the aromatic π-electron system.

350 / Q050 EXPECTED • CEE-STYLE PRACTICE

The linkage joining two amino acids in a peptide is a/an:

A. Ether
B. Ester
C. Amide
D. Acetal

ANSWER C • Amide
WHY A peptide bond is an amide bond formed with loss of water.

BOTANY / 20 QUESTIONS

351 / Q051 SEPARATE ADVANCED MOCK • ref Q54

During primary succession on lava, early colonizers facilitate later species mainly by:

A. forming soil and modifying microclimate
B. eliminating nutrient cycles
C. preventing weathering
D. removing all organic matter

ANSWER A • forming soil and modifying microclimate
WHY Pioneer communities create organic matter and soil, making the environment suitable for later colonists.

352 / Q052 SEPARATE ADVANCED MOCK • ref Q73

A plant supplied nitrate but lacking magnesium develops chlorosis because magnesium is required chiefly for:

A. DNA base pairing only
B. stomatal pores
C. the chlorophyll molecule and enzyme function
D. cellulose monomers

ANSWER C • the chlorophyll molecule and enzyme function
WHY Magnesium is the central metal in chlorophyll and participates in numerous enzyme processes.

353 / Q053 2024 • MEMORY-BASED • ref Q27

Turpentine oil is extracted from:

A. Pinus
B. Cycas
C. Cedrus
D. Fern

ANSWER A • Pinus
WHY Turpentine is obtained from the resinous secretions of pine (Pinus).

354 / Q054 2024 • MEMORY-BASED • ref Q33

The plant part used for tissue culture is called:

A. Stock
B. Explant
C. Callus
D. Scion

ANSWER B • Explant
WHY An explant is the small plant part excised and cultured in nutrient medium.

355 / Q055 2023 • ADAPTED • ref Q104 (corrected genus spelling)

Which of these is mismatched?

A. Phaneros — Visible
B. Gymno — Naked
C. Bryum – Liverworts
D. Kryptos — Concealed

ANSWER C • Bryum – Liverworts
WHY Bryum is a moss rather than a liverwort; this makes the pairing incorrect.

356 / Q056 2023 • MEMORY-BASED • ref Q122

Commercial jute fibres are obtained from bark Bark is anatomically:

A. Outside the vascular cambium and is phloem fibres
B. Outside the cork cambium and is phellem
C. All parts outside to pith
D. All parts outside to the vascular cambium

ANSWER A • Outside the vascular cambium and is phloem fibres
WHY Bast or phloem fibres occur outside vascular cambium; xylem develops mainly inward.

357 / Q057 2023 • MEMORY-BASED • ref Q138

A researcher working on plant species wants to preserve the plant and stores it in a cold temperature so that the plant remains viable for a long period of time. This method of preservation of biological species by storing them at a cold temperature is known as:

A. Vemalization
B. In situ preservation
C. Cryopreservation
D. In vitro storage

ANSWER C • Cryopreservation
WHY Cryopreservation stores germplasm at very low temperatures, often using liquid nitrogen.

358 / Q058 2025 • MEMORY-BASED • ref Q64

Obligate relationship is found in?

A. Mutualism
B. Commensalin
C. Protocooperation
D. Ammensalin

ANSWER A • Mutualism
WHY Obligate mutualism means the partners both benefit and depend strongly on one another.

359 / Q059 2025 • MEMORY-BASED • ref Q73

During in active period, the pores of older sieve tube are blocked by structures called as which is called:

A. Callose
B. Sclereids
C. Tyloses
D. Calyptrogen

ANSWER A • Callose
WHY Callose deposits plug sieve pores as sieve elements age or respond to injury.

360 / Q060 2022 • ADAPTED • ref Q10

Hemp bast fibres are especially rich in which cell-wall polymer?

A. Cellulose
B. Protein
C. Starch
D. Sucrose

ANSWER A • Cellulose
WHY Bast sclerenchyma fibres contain cellulose-rich secondary cell walls.

361 / Q061 SEPARATE ADVANCED MOCK • ref Q45

A bryophyte and a fern both require free water for fertilization, but the fern is taller chiefly because it possesses:

A. seeds and flowers
B. vascular tissues and a dominant sporophyte
C. a dominant gametophyte only
D. pollen tubes

ANSWER B • vascular tissues and a dominant sporophyte
WHY Ferns have lignified vascular tissue and a dominant sporophyte, enabling greater size than bryophytes.

362 / Q062 2024 • MEMORY-BASED • ref Q8

Which linkage is present between the glucose units in Amylose of starch?

A. Peptide bond
B. Ester linkage
C. Glycosidic bond
D. Phosphodiester bond

ANSWER C • Glycosidic bond
WHY Amylose consists mainly of α(1→4) glycosidic bonds between glucose residues.

363 / Q063 2025 • MEMORY-BASED • ref Q70

In photosynthesis. O_2 is evolved from water during:

A. Oxidative photophosrylation
B. Photolysis of water
C. Photo-excitatiouof chat
D. Exitation of electron

ANSWER B • Photolysis of water
WHY Photosynthesis converts light energy into chemical energy in chloroplasts.

364 / Q064 2022 • MEMORY-BASED • ref Q24

Root and shoot elongation in callus can be done by altering the ratio of

A. Auxin to cytokinin
B. Auxin to gibberellin
C. Cytokinin to gibberellin
D. Auxin to ethylene

ANSWER A • Auxin to cytokinin
WHY Higher auxin relative to cytokinin usually favors roots; higher cytokinin favors shoots.

365 / Q065 SEPARATE ADVANCED MOCK • ref Q56

A plant cell in concentrated salt solution loses turgor but its wall retains shape. The immediate event is:

A. rupture caused by turgor
B. active uptake of all salt
C. exosmosis and plasmolysis
D. endosmosis and deplasmolysis

ANSWER C • exosmosis and plasmolysis
WHY Water exits a cell by osmosis in hypertonic solution, so the protoplast pulls away from the wall.

366 / Q066 SEPARATE ADVANCED MOCK • ref Q80

A genetically engineered insect-resistant crop reduces insecticide use, but resistance management is needed because:

A. all insects mutate only after spraying
B. the transgene disappears in one generation
C. natural selection cannot act on insects
D. selection can increase resistant insect genotypes

ANSWER D • selection can increase resistant insect genotypes
WHY Natural selection favors pre-existing heritable resistance alleles when insects encounter a pest-control agent.

367 / Q067 2024 • MEMORY-BASED • ref Q22

Which of the following is a common cell organelle between prokaryotes and eukaryotes?

A. Nucleus
B. Mitochondria
C. Ribosomes
D. Nucleolus

ANSWER C • Ribosomes
WHY Ribosomes occur in both bacterial and eukaryotic cells and translate mRNA into protein.

368 / Q068 2023 • MEMORY-BASED • ref Q109

The part of the chromosome after the secondary constriction is known as:

A. Telomere
B. Chromomere
C. Nuclear Organizer
D. Satellite

ANSWER D • Satellite
WHY A chromosome satellite is the short distal segment separated by a secondary constriction.

369 / Q069 2025 • MEMORY-BASED • ref Q55

An enzyme that can cut DNA molecules at specific site is:

A. Lipose
B. Nuclease
C. Restriction Endonuclease
D. Ligose

ANSWER C • Restriction Endonuclease
WHY Restriction endonucleases recognize DNA sequences and cleave at or near those specific sites.

370 / Q070 2022 • MEMORY-BASED • ref Q4

Plant cells are connected with each other by means of

A. Tight junction
B. Gap junction
C. Plasmodesmata
D. Desmoneme

ANSWER C • Plasmodesmata
WHY Plasmodesmata connect neighboring plant-cell cytoplasm through cell-wall channels.

ZOOLOGY / 20 QUESTIONS

371 / Q071 2024 • ADAPTED • ref Q20

The malarial pigment haemozoin is produced when Plasmodium detoxifies which toxic digestion by-product?

A. Free heme from haemoglobin
B. Glucose
C. Albumin
D. Cholesterol

ANSWER A • Free heme from haemoglobin
WHY Haemoglobin digestion releases free heme, which the parasite converts to haemozoin.

372 / Q072 2024 • MEMORY-BASED • ref Q33

Which segment of Earthworm contains the male genital aperture?

A. 10th
B. 17th
C. 18th
D. 19th

ANSWER C • 18th
WHY In the commonly studied earthworm Pheretima, male genital pores open on the 18th segment.

373 / Q073 2023 • MEMORY-BASED • ref Q150

Gall bladder location in frog?

A. In between two lobes of liver & invisible
B. Between two small left lobes
C. Between night & left lobe
D. between right lobes

ANSWER A • In between two lobes of liver & invisible
WHY The gallbladder lies beneath/between the lobes of the liver and stores bile.

374 / Q074 2025 • MEMORY-BASED • ref Q109

Which one is vertebrate?

A. Cuttle fish
B. Globe fish
C. Cray fish
D. Devil fish

ANSWER B • Globe fish
WHY Globe fish is a vertebrate bony fish, unlike invertebrates such as jellyfish or starfish.

375 / Q075 2026 • MODEL PAPER

An adult sea star belongs to which phylum?

A. Echinodermata
B. Annelida
C. Porifera
D. Mollusca

ANSWER A • Echinodermata
WHY Adult echinoderms have pentaradial organization and a water-vascular system.

376 / Q076 2024 • MEMORY-BASED • ref Q1

Water vascular system is found in:

A. Mollusca
B. Cnidaria (Coelenterata)
C. Echinodermata
D. Chordata

ANSWER C • Echinodermata
WHY Echinoderms operate tube feet using a water vascular system for movement and other functions.

377 / Q077 2024 • MEMORY-BASED • ref Q13

Pseudostratified epithelium is found in?

A. Trachea
B. Stomach
C. Larynx
D. Blood vessels

ANSWER A • Trachea
WHY Ciliated pseudostratified columnar epithelium lines much of the trachea and moves mucus.

378 / Q078 2024 • MEMORY-BASED • ref Q23

A young infant may be feeding entirely on mother's milk which is white in colour but the stools on which the infant passes out are quite yellowish. what is this yellow colour due to?

A. Bile pigments secreted by liver
B. Undigested milk protein Casein
C. Intestinal juice
D. Pancreatic juice

ANSWER A • Bile pigments secreted by liver
WHY Bile pigments such as bilirubin are transformed in the intestine into pigments that color stool yellow-brown.

379 / Q079 2024 • MEMORY-BASED • ref Q39

Which of the following protein helps in transportation?

A. Keratin
B. Albumin
C. Ricin
D. Actin

ANSWER B • Albumin
WHY Albumin is the major plasma protein for colloid osmotic pressure and transport of several substances.

380 / Q080 2023 • MEMORY-BASED • ref Q147

Chloragogen cells is analogous to?

A. Kidney of vertebrates
B. Liver of vertebrates
C. Gut of vertebrates
D. Lungs of vertebrates

ANSWER B • Liver of vertebrates
WHY Earthworm chloragogen cells perform liver-like functions in storage, metabolism, and nitrogen processing.

381 / Q081 2023 • MEMORY-BASED • ref Q171

Which of the following is stretchable tissue?

A. Columnar
B. Squamous
C. Cuboidal
D. Transitional

ANSWER D • Transitional
WHY Transitional epithelium can stretch and change cell shape as the urinary bladder fills.

382 / Q082 2025 • MEMORY-BASED • ref Q97

Intestinal caeca is present in which segment?

A. 224 sesinent
B. 26" segment
C. 20" segment
D. 21th segment

ANSWER B • 26" segment
WHY The intestinal caeca of Pheretima typically extend from the 26th segment.

383 / Q083 2025 • ADAPTED • ref Q110

Enteropeptidase (enterokinase) differs from pancreatic lipase and amylase because its principal role is to:

A. Digest triglycerides directly
B. Activate trypsinogen to trypsin
C. Digest starch directly
D. Transport bile acids

ANSWER B • Activate trypsinogen to trypsin
WHY Enteropeptidase activates trypsinogen; it is not principally a nutrient-digesting hydrolase.

384 / Q084 2022 • ADAPTED • ref Q13

Aldosterone is secreted from which layer of the adrenal cortex?

A. Zona glomerulosa
B. Zona fasciculata
C. Zona reticularis
D. Adrenal medulla

ANSWER A • Zona glomerulosa
WHY Mineralocorticoid aldosterone is secreted chiefly by the zona glomerulosa.

385 / Q085 2022 • MEMORY-BASED • ref Q29

Haversian canals are inter connected by

A. Lamellae
B. Canaliculi ,
C. Volkmann's canal
D. Lacunae

ANSWER C • Volkmann's canal
WHY Volkmann canals connect longitudinal Haversian canals across compact bone.

386 / Q086 2024 • ADAPTED • ref Q2

Which nitrogenous waste is the principal nitrogen excretory product in adult humans?

A. Ammonia
B. Urea
C. Uric acid
D. Guanine

ANSWER B • Urea
WHY Humans are predominantly ureotelic; the liver converts ammonia to urea.

387 / Q087 2024 • ADAPTED • ref Q17

T lymphocyte precursors originate in marrow but mature principally in the:

A. Tonsils
B. Spleen
C. Thymus
D. Pancreas

ANSWER C • Thymus
WHY The thymus is the primary lymphoid organ for T-cell maturation.

388 / Q088 2023 • MEMORY-BASED • ref Q149

Heart of frog differs from mammals by presence of

A. Tricuspid valve
B. Mitral valve
C. Two auricle
D. sinus venosus

ANSWER D • sinus venosus
WHY A frog heart has a sinus venosus that receives venous blood, unlike the typical mammalian cardiac plan.

389 / Q089 2023 • ADAPTED • ref Q172

Parathyroid hormone primarily produces which effect on plasma calcium?

A. Lowers Ca^{2+} by inhibiting bone resorption
B. Raises Ca^{2+} by supporting renal retention and bone resorption
C. Eliminates calcium absorption from intestine
D. Lowers calcium by directly activating calcitonin

ANSWER B • Raises Ca^{2+} by supporting renal retention and bone resorption
WHY PTH raises blood Ca^{2+} through bone, kidney and vitamin-D-dependent intestinal effects.

390 / Q090 2022 • MEMORY-BASED • ref Q23

Organ of mechanical digestion in earthworm is

A. Gizzard
B. Pharynx
C. Stomach
D. Intestine

ANSWER A • Gizzard
WHY The earthworm muscular gizzard pulverizes food before intestinal digestion.

MENTAL AGILITY (MAT) / 10 QUESTIONS

391 / Q091 EXPECTED • CEE-STYLE PRACTICE

Two adult tickets and three child tickets cost Rs. 77. Three adult tickets and two child tickets cost Rs. 78. What are the respective adult and child fares?

A. Rs. 16, Rs. 15
B. Rs. 17, Rs. 14
C. Rs. 14, Rs. 17
D. Rs. 15, Rs. 16

ANSWER A • Rs. 16, Rs. 15
WHY Solve 2a + 3c = 77 and 3a + 2c = 78 to obtain adult Rs. 16 and child Rs. 15.

392 / Q092 EXPECTED • CEE-STYLE PRACTICE

Two taps fill a tank in 6 h and 3 h individually. Together they fill it in:

A. 1 h
B. 2 h
C. 3 h
D. 4 h

ANSWER B • 2 h
WHY Combined rate = 1/6 + 1/3 = 1/2 tank per hour.

393 / Q093 EXPECTED • CEE-STYLE PRACTICE

Choose the analogy: HEART : CARDIOLOGY :: KIDNEY : ?

A. Neurology
B. Nephrology
C. Dermatology
D. Oncology

ANSWER B • Nephrology
WHY Nephrology is the medical specialty dealing with kidneys.

394 / Q094 EXPECTED • CEE-STYLE PRACTICE

In a line, Mira is 7th from the left and 12th from the right. Total persons are:

A. 17
B. 18
C. 19
D. 20

ANSWER B • 18
WHY Total = 7 + 12 − 1 = 18.

395 / Q095 2024 • MEMORY-BASED • reformulated Q5

If 11 (170) 16 and 11 (203) 19 follow the same rule, what fills 17 (?) 18?

A. 296
B. 300
C. 306
D. 318

ANSWER B • 300
WHY The middle number is product of outer numbers minus six: 17×18−6=300.

396 / Q096 PYQ-DERIVED • CEE-STYLE PRACTICE

A student is 15th from the left and 18th from the right in a row. How many students are in that row?

A. 31
B. 32
C. 33
D. 34

ANSWER B • 32
WHY Total =15+18−1=32 because the student was counted twice.

397 / Q097 PYQ-DERIVED • CEE-STYLE PRACTICE

Find the next term: 4, 9, 19, 39, 79, ?

A. 118
B. 139
C. 159
D. 169

ANSWER C • 159
WHY Each term is twice the previous term plus one.

398 / Q098 PYQ-DERIVED • CEE-STYLE PRACTICE

Choose the odd term in the group: 16, 25, 36, 49, 63, 81.

A. 25
B. 49
C. 63
D. 81

ANSWER C • 63
WHY All except 63 are perfect squares.

399 / Q099 PYQ-DERIVED • CEE-STYLE PRACTICE

If every surgeon is a doctor and no doctor is an engineer, which conclusion must hold?

A. Some surgeons are engineers
B. No surgeons are engineers
C. All engineers are doctors
D. No doctors are surgeons

ANSWER B • No surgeons are engineers
WHY A surgeon is a doctor, and the doctor and engineer sets are disjoint.

400 / Q100 PYQ-DERIVED • CEE-STYLE PRACTICE

A class has 30 students with an average score of 68. Another class has 20 students averaging 78. The combined average is:

A. 70
B. 71
C. 72
D. 73

ANSWER C • 72
WHY Weighted mean = (30×68+20×78)/50=72.

PYQ ANALYSIS PAPER 05

100 CEE MCQs • Four options • Answer and explanation after each question
PHYSICS 25 / CHEMISTRY 25 / BOTANY 20 / ZOOLOGY 20 / MAT 10
Source tag shown above every MCQ. "Advanced mock" and "model paper" labels do not indicate an official PYQ.

PHYSICS / 25 QUESTIONS

401 / Q001 SEPARATE ADVANCED MOCK • ref Q136

A rigid body has zero net external force but a nonzero net external torque about its centre of mass. It can have:

A. zero angular acceleration necessarily
B. neither translation nor rotation
C. constant linear momentum and changing angular momentum
D. changing linear momentum and constant angular momentum

ANSWER C • constant linear momentum and changing angular momentum
WHY Net torque produces angular acceleration according to $\tau = I\alpha$.

402 / Q002 SEPARATE ADVANCED MOCK • ref Q178

[Numerical] A galaxy recedes at 1400 km/s. If H_0=70 km s−1 Mpc−1, its estimated distance is:

A. 10 Mpc
B. 98 Mpc
C. 70 Mpc
D. 20 Mpc

ANSWER D • 20 Mpc
WHY Hubble law is $v = H_0 d$, so $d = v/H_0$.

403 / Q003 2024 • MEMORY-BASED • ref Q5

The property of retentivity of a material is used in the construction of:

A. Permanent magnet
B. Electromagnet
C. Transformer
D. Galvanometer

ANSWER A • Permanent magnet
WHY High retentivity means a ferromagnet retains magnetization after the external field is removed.

404 / Q004 2024 • MEMORY-BASED • ref Q18

Which of the following quantities has the dimensions [ML-1T-1]?

A. Torque
B. Force
C. Surface Tension
D. Viscosity

ANSWER D • Viscosity
WHY Dynamic viscosity η follows $F=\eta A(dv/dx)$; its dimensions are $[M\ L^{-1}\ T^{-1}]$.

405 / Q005 2024 • MEMORY-BASED • ref Q33

The apparent weight of a body in a lift is less than its actual weight. The lift must be moving:

A. Down with an acceleration
B. Up with an acceleration
C. Down with uniform velocity
D. Not moving at all

ANSWER A • Down with an acceleration
WHY Downward acceleration reduces the normal reaction to $N=m(g-a)$.

406 / Q006 2023 • MEMORY-BASED • ref Q14

The coefficient of viscosity for hot air is

A. Greater than that for cold air
B. Smaller than that for cold air
C. Same as that of cold air
D. Lower at high pressure and greater at low pressure

ANSWER A • Greater than that for cold air
WHY For a gas, viscosity generally rises with temperature because molecular transport becomes more effective.

407 / Q007 2025 • MEMORY-BASED • ref Q178

The scientific reason behind placing the handle of a door close to the for edge of the door is:

A. To produce a large torque from a small effort
B. To produce larger momentun
C. To produce a large force from a small torque
D. To protect the door from unsual bonding

ANSWER A • To produce a large torque from a small effort
WHY Torque $\tau = Fr \sin\theta$; greater distance from the hinge gives larger torque for the same force.

408 / Q008 2022 • MEMORY-BASED • ref Q37

Bats can locomote at night due to echolocation by producing

A. Ultrasonic
B. Infrasonic
C. Radiowave
D. Electromagnetic waves

ANSWER A • Ultrasonic
WHY Echolocation relies on ultrasound reflected from objects to infer distance and direction.

409 / Q009 2021 • ADAPTED

A body makes an obtuse contact angle with glass. Its liquid surface is usually described as:

A. Completely wetting
B. Non-wetting
C. Perfectly spreading
D. Adhesion-dominated

ANSWER B • Non-wetting
WHY Contact angles greater than 90° indicate cohesive forces dominate wetting.

410 / Q010 SEPARATE ADVANCED MOCK • ref Q157

[Numerical] A cell of emf 12 V and internal resistance 1 Ω supplies 5 Ω. The terminal voltage is:

A. 14 V
B. 10 V
C. 12 V
D. 2 V

ANSWER B • 10 V
WHY Apply Ohm law V = IR and the correct series/parallel relationship.

411 / Q011 SEPARATE ADVANCED MOCK • ref Q165

Inside a conductor in electrostatic equilibrium, the electric field is zero because free charges:

A. cease to exist
B. become neutrons
C. are all at the centre
D. redistribute until their field cancels the internal applied field

ANSWER D • redistribute until their field cancels the internal applied field
WHY Mobile charges redistribute until the net interior electrostatic field of the conductor vanishes.

412 / Q012 2024 • MEMORY-BASED • ref Q7

Which gate is used in the construction of other gates and digital circuits?

A. NOT
B. NAND
C. AND
D. Both NOT and AND

ANSWER B • NAND
WHY NAND alone can be combined to realize NOT, AND, OR and other Boolean gates.

413 / Q013 2024 • ADAPTED • ref Q25

If n identical capacitors, each of capacitance C, are connected in parallel across voltage V, their total energy is:

A. ½CV²
B. ½nCV²
C. nCV²
D. nCV

ANSWER B • ½nCV²
WHY Equivalent capacitance is nC; hence U = ½(nC)V².

414 / Q014 2022 • MEMORY-BASED • ref Q21

Self inductance is independent of

A. Length
B. Diameter
C. Number of turns
D. Resistance

ANSWER D • Resistance
WHY The induced emf opposes flux change: e = −L dI/dt.

415 / Q015 SEPARATE ADVANCED MOCK • ref Q144

During isothermal expansion of an ideal gas, its internal energy remains constant because internal energy depends only on:

A. temperature
B. pressure
C. volume
D. work

ANSWER A • temperature
WHY For an ideal gas U depends only on temperature; under isothermal conditions ΔU = 0.

416 / Q016 EXPECTED • CEE-STYLE PRACTICE

In a thermocouple, the inversion temperature is 400°C and cold junction is held at 20°C. What is the neutral temperature under the standard parabolic-emf approximation?

A. 180°C
B. 200°C
C. 210°C
D. 420°C

ANSWER C • 210°C
WHY For this approximation, $t_i = 2t_n - t_c$, so $t_n = (400 + 20)/2 = 210°C$.

417 / Q017 SEPARATE ADVANCED MOCK • ref Q148

A wave travels from a light string into a heavier string under equal tension. At the boundary its frequency:

A. decreases
B. becomes zero
C. remains fixed by the source
D. increases

ANSWER C • remains fixed by the source
WHY Frequency remains set by the driving source across the boundary; wave speed and wavelength can change.

418 / Q018 SEPARATE ADVANCED MOCK • ref Q169

Light of frequency below the threshold strikes a metal with arbitrarily high intensity. Photoelectrons are absent because:

A. total energy is always zero
B. intensity lowers work function to infinity
C. electrons require momentum but photons have none
D. each photon lacks sufficient energy

ANSWER D • each photon lacks sufficient energy
WHY Each photon must satisfy $hf \geq \varphi$. Greater intensity adds subthreshold photons but cannot eject electrons.

419 / Q019 2025 • MEMORY-BASED • ref Q171

The focal length of a convex lens depends upon:

A. The wavelength of incident ray
B. The frequency of incident ray
C. Both on frequency and wavelength of incident ray
D. Neither on frequency vor on wavelength of incident ray

ANSWER C • Both on frequency and wavelength of incident ray
WHY For thin lenses, use $1/f = 1/v - 1/u$ with the chosen sign convention.

420 / Q020 SEPARATE ADVANCED MOCK • ref Q174

An intrinsic semiconductor is warmed. Its conductivity generally:

A. decreases because all electrons stop
B. increases because more electron-hole pairs are generated
C. remains exactly constant
D. becomes superconducting

ANSWER B • increases because more electron-hole pairs are generated
WHY Heating intrinsic semiconductor generates more electron–hole pairs and raises conductivity.

421 / Q021 2024 • ADAPTED • ref Q34

A Zener diode differs from an ordinary rectifier diode because it is designed primarily to:

A. Operate predictably in reverse breakdown
B. Increase forward resistance indefinitely
C. Convert AC to mechanical energy
D. Act only as a light sensor

ANSWER A • Operate predictably in reverse breakdown
WHY A Zener diode provides a specified reverse breakdown voltage for regulation.

422 / Q022 2023 • MEMORY-BASED • ref Q17

Potential barrier in PN-diode is due to

A. Diffusion of charge carriers
B. Drift of electrons
C. Drift of holes
D. Forbidden energy band

ANSWER A • Diffusion of charge carriers
WHY Majority carriers diffuse across the junction and leave fixed ions that create its built-in barrier.

423 / Q023 2026 • MODEL PAPER

A photon with energy just equal to the work function liberates an electron with maximum kinetic energy:

A. Zero
B. Equal to work function
C. Twice work function
D. Infinite

ANSWER A • Zero
WHY Einstein's equation $K_{max} = hf - \varphi$ gives zero at threshold.

424 / Q024 EXPECTED • CEE-STYLE PRACTICE

An ideal Carnot engine operating between 500 K and 300 K has efficiency:

A. 20%
B. 40%
C. 60%
D. 80%

ANSWER B • 40%
WHY $\eta = 1 - T_c/T_h = 1 - 300/500 = 0.40$.

425 / Q025 EXPECTED • CEE-STYLE PRACTICE

Majority carriers in an n-type semiconductor are:

A. Holes
B. Electrons
C. Protons
D. Photons

ANSWER B • Electrons
WHY Donor impurities increase mobile conduction electrons.

CHEMISTRY / 25 QUESTIONS

426 / Q026 SEPARATE ADVANCED MOCK • ref Q89

Two solutions have pH 3 and pH 5. The first has, ideally:

A. 100 times the [H+]
B. 2 times the [H+]
C. the same [H+]
D. 1/100 the [H+]

ANSWER A • 100 times the [H+]
WHY The hydrogen-ion concentration changes by a factor of ten for each one-unit pH difference.

427 / Q027 SEPARATE ADVANCED MOCK • ref Q97

When equal volumes of 0.10 M strong acid and 0.10 M strong base are mixed at 25°C, the final pH is near 7 because:

A. H+ and OH− react stoichiometrically to water
B. both remain at 0.05 M
C. the acid becomes weak
D. pH values are averaged arithmetically

ANSWER A • H+ and OH− react stoichiometrically to water
WHY Equivalent strong-acid and strong-base amounts consume one another, leaving neutral salt solution near pH 7.

428 / Q028 2024 • MEMORY-BASED • ref Q12

H_2S is a gas but H_2O is a liquid because:

A. H_2O is more ionic
B. H_2O has higher molecular weight
C. Due to association by Hydrogen bonding
D. O is more electronegative than S

ANSWER C • Due to association by Hydrogen bonding
WHY Strong intermolecular hydrogen bonding makes H_2O much less volatile than H_2S.

429 / Q029 2024 • MEMORY-BASED • ref Q29

The existence of 3 unpaired electrons in Nitrogen atom is explained by:

A. Pauli's exclusion principle
B. Hund's rule of Maximum multiplicity
C. Aufbau principle
D. De Broglie hypothesis

ANSWER B • Hund's rule of Maximum multiplicity
WHY Hund rule fills degenerate orbitals singly with parallel spins before pairing.

430 / Q030 2023 • MEMORY-BASED • ref Q90

Which allotrope of phosphorus produces phosphorescence?

A. Scarlet phosphorus
B. Red phosphorus
C. Black phosphorus
D. White phosphorus

ANSWER D • White phosphorus
WHY White phosphorus emits a weak glow during slow oxidation in air.

431 / Q031 2022 • ADAPTED • ref Q34

The fundamental limit on simultaneously specifying an electron's position and momentum is described by:

A. Bohr orbit postulate
B. Heisenberg uncertainty principle
C. Hund rule
D. Avogadro law

ANSWER B • Heisenberg uncertainty principle
WHY $\Delta x \cdot \Delta p \geq \hbar/2$; exact position and momentum cannot both be specified arbitrarily well.

432 / Q032 SEPARATE ADVANCED MOCK • ref Q86

A catalyst speeds both forward and reverse reactions because it:

A. lowers activation barriers for both directions
B. makes an endothermic reaction exothermic
C. changes $\Delta G°$
D. increases equilibrium constant

ANSWER A • lowers activation barriers for both directions
WHY A catalyst creates a lower-energy pathway for both directions but does not change their equilibrium constant.

433 / Q033 SEPARATE ADVANCED MOCK • ref Q100

$AlCl_3$ behaves as a Lewis acid because aluminium:

A. can accept an electron pair into an incomplete valence shell
B. releases H+ from every solvent
C. donates a lone pair
D. has a filled octet in the monomer

ANSWER A • can accept an electron pair into an incomplete valence shell
WHY Electron-deficient $AlCl_3$ accepts a lone pair and therefore acts as a Lewis acid.

434 / Q034 SEPARATE ADVANCED MOCK • ref Q108

2-methylpropene reacts with HBr without peroxide. The major product follows Markovnikov addition because:

A. the double bond remains unchanged
B. the more stable tertiary carbocation pathway is favored
C. Br+ attacks the less substituted carbon first
D. a primary radical is mandatory

ANSWER B • the more stable tertiary carbocation pathway is favored
WHY A tertiary carbocation intermediate is more stable; HBr addition therefore follows Markovnikov orientation.

435 / Q035 2024 • ADAPTED • ref Q2

Benzene treated with an alkyl halide and anhydrous $AlCl_3$ undergoes which named reaction?

A. Cannizzaro reaction
B. Friedel–Crafts alkylation
C. Aldol condensation
D. Wurtz reaction

ANSWER B • Friedel–Crafts alkylation
WHY Friedel–Crafts alkylation substitutes an alkyl group onto an aromatic ring.

436 / Q036 2024 • MEMORY-BASED • ref Q9

When chloroform reacts with conc. HNO_3, it gives:

A. Nitropicrin
B. Chloropicrin
C. Nitro-chloropicrin
D. Chloro-Nitroform

ANSWER B • Chloropicrin
WHY Chloroform reacts with concentrated HNO_3 to give chloropicrin (trichloronitromethane).

437 / Q037 2024 • MEMORY-BASED • ref Q24

When CO_2 is passed through lime water, the solution turns milky. But, when further CO_2 is added, the milkiness disappears due to the formation of:

A. Soluble $CaCO_3$
B. Insoluble $CaCO_3$
C. Soluble $Ca(HCO_3)_2$
D. Insoluble $Ca(HCO_3)_2$

ANSWER C • Soluble $Ca(HCO_3)_2$
WHY Excess CO_2 forms soluble $Ca(HCO_3)_2$ from initially precipitated $CaCO_3$, clearing the suspension.

438 / Q038 2024 • MEMORY-BASED • ref Q44

Nuclear reactors work on the principle of:

A. Nuclear fusion
B. Nuclear fission
C. Natural radioactivity
D. Radioactive emission

ANSWER B • Nuclear fission
WHY A heavy nucleus splits into smaller nuclei with energy release and more neutrons, sustaining chain reaction.

439 / Q039 2023 • MEMORY-BASED • ref Q65

Which compound when treated with alkali & iodine gives hospital smell?

A. 2-propanone
B. Propanal
C. 3-pentanone
D. Iodine

ANSWER A • 2-propanone
WHY Methyl ketones with I_2/alkali give pale-yellow CHI_3 (iodoform), with characteristic medicinal odor.

440 / Q040 2023 • MEMORY-BASED • ref Q85

Which is used in reducing body temperature?

A. Antipyretic
B. Antiseptic
C. Analgesic
D. Disinfectant

ANSWER A • Antipyretic
WHY Antipyretics reduce fever by lowering the hypothalamic temperature set-point.

441 / Q041 2025 • MEMORY-BASED • ref Q2

Which of the following gives amino acids as end product after digestion?

A. Fats
B. Lipids
C. Proteins
D. Enzymes

ANSWER C • Proteins
WHY Proteolytic digestive enzymes hydrolyse polypeptides into amino acids.

442 / Q042 EXPECTED • CEE-STYLE PRACTICE

Which element in glycine can be detected using a properly performed Lassaigne sodium-fusion test?

A. Nitrogen
B. Chlorine
C. Bromine
D. Iodine

ANSWER A • Nitrogen
WHY Glycine contains nitrogen; sodium fusion converts it to detectable cyanide under appropriate conditions.

443 / Q043 2022 • MEMORY-BASED • ref Q31

Fractional crystallization is based on the difference of

A. Solubility
B. Density
C. Bpt
D. Vapour pressure

ANSWER A • Solubility
WHY Fractional crystallization separates substances because their solubilities differ with temperature.

444 / Q044 EXPECTED • CEE-STYLE PRACTICE

Which species is the conjugate base of $H_2PO_4^-$?

A. H_3PO_4
B. HPO_4^{2-}
C. PO_4^{3-}
D. $H_2PO_4^{2+}$

ANSWER B • HPO_4^{2-}
WHY Loss of one proton from $H_2PO_4^-$ forms HPO_4^{2-}.

445 / Q045 SEPARATE ADVANCED MOCK • ref Q123

Addition polymerization of ethene changes each monomer primarily by:

A. eliminating CO_2 from every unit
B. opening the π bond to form new σ bonds in a chain
C. retaining isolated C=C bonds in each repeat unit
D. forming peptide bonds

ANSWER B • opening the π bond to form new σ bonds in a chain
WHY The π bond of ethene opens to form new carbon–carbon σ bonds along the polymer chain.

446 / Q046 2024 • ADAPTED • ref Q46

What is the correct IUPAC name for $CH_3–C(CH_3)_2–CH_2–CH_3$?

A. 3,3-Dimethylbutane
B. 2,2-Dimethylbutane
C. 2-Methylpentane
D. 2,3-Dimethylbutane

ANSWER B • 2,2-Dimethylbutane
WHY The longest chain has four carbons; two methyl substituents are both on carbon 2.

447 / Q047 2025 • ADAPTED • ref Q3

What is the IUPAC name of $CH_3COCH_2CH_2CH_3$?

A. Pentan-3-one
B. Pentan-2-one
C. Butan-2-one
D. Pentanal

ANSWER B • Pentan-2-one
WHY The carbonyl carbon receives the lowest locant, 2.

448 / Q048 2026 • MODEL PAPER

Which alcohol gives a red coloration first in the Victor Meyer test?

A. Primary alcohol
B. Secondary alcohol
C. Tertiary alcohol
D. Phenol

ANSWER A • Primary alcohol
WHY The primary nitroalkane-derived species gives red under alkaline Victor Meyer conditions.

449 / Q049 EXPECTED • CEE-STYLE PRACTICE

Oxidation always occurs at the:

A. Cathode
B. Anode
C. Salt bridge
D. Voltmeter

ANSWER B • Anode
WHY Anode is the oxidation electrode in galvanic and electrolytic cells.

450 / Q050 EXPECTED • CEE-STYLE PRACTICE

In acid–base titration, the equivalence point is defined by:

A. Indicator becoming colorless
B. Stoichiometric reaction completion
C. pH always 7
D. Highest temperature

ANSWER B • Stoichiometric reaction completion
WHY Equivalence depends on the reaction stoichiometry, not a universal pH value.

BOTANY / 20 QUESTIONS

451 / Q051 SEPARATE ADVANCED MOCK • ref Q55

Biomagnification predicts the highest concentration of a persistent lipid-soluble pesticide in:

A. decomposers regardless of food web
B. top consumers feeding through several trophic levels
C. soil water only
D. producers exposed briefly

ANSWER B • top consumers feeding through several trophic levels
WHY Persistent pollutants increase in concentration along successive trophic levels, peaking in top consumers.

452 / Q052 SEPARATE ADVANCED MOCK • ref Q76

Double fertilization produces a zygote and endosperm. The endosperm usually receives nuclei in the ratio:

A. two sperms plus one egg
B. one egg plus one synergid
C. two eggs plus one sperm
D. one sperm plus two polar nuclei

ANSWER D • one sperm plus two polar nuclei
WHY One sperm fuses with the egg; the second joins two polar nuclei to form typically triploid endosperm.

453 / Q053 2024 • MEMORY-BASED • ref Q28

Which of the following is wrong for Solanaceae?

A. Obliquely placed ovary
B. Unilocular ovary
C. Epipetalous stamens
D. Persistent sepal

ANSWER B • Unilocular ovary
WHY Solanaceae commonly have a bicarpellary, syncarpous ovary that is bilocular, not unilocular.

454 / Q054 2024 • MEMORY-BASED • ref Q34

The end product of Glycolysis is:

A. 2 molecules of Pyruvic acid
B. Acetyl Co-A
C. CO_2 and H_2O
D. $NADH_2$

ANSWER A • 2 molecules of Pyruvic acid
WHY Glycolysis converts one glucose to two pyruvate molecules, netting two ATP and two NADH.

455 / Q055 2023 • MEMORY-BASED • ref Q105

The taxa of living organism in danger of extinction from the world in the near future if the threats continue to be operative belong to the TUCN category of:

A. Threatened
B. Vulnerable
C. Extinct
D. Endangered

ANSWER D • Endangered
WHY An endangered species faces a high risk of extinction in the wild without effective conservation.

456 / Q056 2023 • MEMORY-BASED • ref Q128

The ecological interaction between two organisms which has a negative impact on both the organisms is:

A. Predation
B. Parasitism
C. Competition
D. Amensalism

ANSWER C • Competition
WHY Competition harms both participants by reducing access to a shared limiting resource.

457 / Q057 2023 • MEMORY-BASED • ref Q140

Which of the following is true for wine and beer?

A. Yeast is used for fermentation of beer and bacteria is used for fermentation of wine
B. Beer is prepared from fermented malt and wine from fermented molasses
C. Beer is prepared from fermented malt and wine is prepared from fermented fruits
D. Both beer and wine are prepared from fermented malt

ANSWER C • Beer is prepared from fermented malt and wine is prepared from fermented fruits
WHY Beer commonly ferments malt sugars, while wine commonly ferments fruit sugars.

458 / Q058 2025 • MEMORY-BASED • ref Q66

Organisms found the bottom of sea are:

A. Nertons
B. Benthos
C. Phytons
D. Plalctons

ANSWER B • Benthos
WHY Benthos is the community living at or near the bottom of aquatic habitats.

459 / Q059 2025 • MEMORY-BASED • ref Q74

Grafting is not possible in monocots because

A. Lack of vascular tissue
B. Having smaller stem
C. Scattered vascular bundle
D. Absence of cambium

ANSWER D • Absence of cambium
WHY Typical monocots lack a continuous vascular cambium, preventing ordinary graft union and secondary growth.

460 / Q060 2022 • MEMORY-BASED • ref Q11

Botanical name of sunflower is

A. Allium cepa
B. Tagetes patula
C. Helianthus annuus
D. Brassica rapa

ANSWER C • Helianthus annuus
WHY The accepted sunflower binomial is Helianthus annuus (family Asteraceae).

461 / Q061 SEPARATE ADVANCED MOCK • ref Q48

A flower has parallel venation, fibrous roots and floral parts in threes. If secondary growth is absent, the combined evidence supports:

A. a bryophyte
B. a typical monocot
C. a typical dicot
D. a gymnosperm

ANSWER B • a typical monocot
WHY Parallel venation and fibrous roots are classic monocot characters, usually paired with trimerous flowers.

462 / Q062 2024 • MEMORY-BASED • ref Q24

The rate of transpiration increases when:

A. Increase in humidity
B. Increase in light intensity
C. Decrease in wind velocity
D. Decrease in temperature

ANSWER B • Increase in light intensity
WHY Light opens stomata in many plants and can increase transpiration if other conditions are not limiting.

463 / Q063 2025 • MEMORY-BASED • ref Q75

Cucurbits have___ vascular bundle

A. Conjoint collateral
B. Conjoint bicollateral
C. Radial
D. Concentric

ANSWER B • Conjoint bicollateral
WHY Conjoint bicollateral bundles place xylem and phloem together, with phloem on both sides.

464 / Q064 2022 • MEMORY-BASED • ref Q26

Winged pollen of pinus develops from

A. intine
B. exine
C. ex-intine
D. germ layer

ANSWER B • exine
WHY The air-filled pollen wings of Pinus arise as extensions of the outer pollen wall (exine).

465 / Q065 SEPARATE ADVANCED MOCK • ref Q57

Blocking spindle formation during mitosis most directly prevents:

A. cell-wall synthesis in every phase
B. chromosome segregation to daughter nuclei
C. DNA replication in interphase
D. transcription permanently

ANSWER B • chromosome segregation to daughter nuclei
WHY The spindle separates chromosomes during division; without it, normal segregation cannot occur.

466 / Q066 2024 • MEMORY-BASED • ref Q3

Which of the following cell organelle is incorrectly matched with its function?

A. Chloroplast – Photosynthesis
B. Golgi bodies – Protein synthesis
C. Mitochondria – Oxidative Phosphorylation
D. Lysosome - Suicidal bags

ANSWER B • Golgi bodies – Protein synthesis
WHY Ribosomes on rough ER synthesize many proteins; Golgi mainly modifies, sorts, and packages them.

467 / Q067 2024 • ADAPTED • ref Q23

An organism with identical alleles of a gene at a locus is termed:

A. Hemizygous
B. Homozygous
C. Heterozygous
D. Polyploid

ANSWER B • Homozygous
WHY Homozygous means the two alleles at a diploid locus are the same.

468 / Q068 2023 • MEMORY-BASED • ref Q117

The presence of more than two allelic forms for a single gene is known as:

A. Epistatis
B. Pleiotropism
C. Blending Inheritance
D. Multiple Allelism

ANSWER D • Multiple Allelism
WHY Multiple alleles means more than two alternative alleles exist in a population for one locus.

469 / Q069 2025 • MEMORY-BASED • ref Q76

Which chromosome has centromere at center?

A. Metacentric
B. Sub-metacentric
C. Telocentric
D. Acrocentric

ANSWER A • Metacentric
WHY Metacentric chromosomes have a centrally positioned centromere, creating nearly equal arms.

470 / Q070 2022 • MEMORY-BASED • ref Q28

Lf the gametes of parental generation are reversed in the offspring's then the cross is

A. Reverse cross
B. Reciprocal cross
C. Test cross
D. Dthybrid cross ,

ANSWER B • Reciprocal cross
WHY Reciprocal crosses reverse male and female parent genotypes to test whether inheritance depends on sex.

ZOOLOGY / 20 QUESTIONS

471 / Q071 2024 • MEMORY-BASED • ref Q25

Evolution of enterocoelom first occurred in:

A. Mollusca
B. Chordata
C. Hemichordate
D. Echinodermata

ANSWER D • Echinodermata
WHY Enterocoely forms body cavities from outpocketings of the archenteron in deuterostome development.

472 / Q072 2024 • MEMORY-BASED • ref Q35

Which segments of earthworm lack setae?

A. First and Last
B. First three
C. Clitellar
D. First, last and clitellar

ANSWER D • First, last and clitellar
WHY Setae are absent from the first, final and clitellar segments of a typical earthworm.

473 / Q073 2023 • MEMORY-BASED • ref Q152

In male frog, loud croaking is due to

A. Vocal cord resonating
B. Vocal sacs with air resonating
C. Two pairs of vocal sacs
D. Well developed vocal sacs

ANSWER B • Vocal sacs with air resonating
WHY Male frog vocal sacs resonate and amplify croaking sounds during calling.

474 / Q074 2022 • ADAPTED • ref Q3

In the life cycle of Plasmodium, sexual reproduction (fertilization) occurs inside the:

A. Human liver
B. Human red blood cell
C. Female Anopheles mosquito
D. Freshwater snail

ANSWER C • Female Anopheles mosquito
WHY Gametes fuse in the mosquito gut; human stages are asexual.

475 / Q075 2026 • MODEL PAPER

A frog's vocal sacs principally function as:

A. Air resonators
B. External ears
C. Digestive sacs
D. Excretory reservoirs

ANSWER A • Air resonators
WHY Vocal sacs amplify and resonate croaks during communication.

476 / Q076 2024 • ADAPTED • ref Q3

What limitation of Darwin's original theory was later explained by genetics?

A. It did not explain the origin and inheritance of genetic variation
B. It denied natural selection
C. It stated all organisms are identical
D. It denied adaptation

ANSWER A • It did not explain the origin and inheritance of genetic variation
WHY Mendelian genetics and mutation supplied mechanisms of variation and inheritance that Darwin did not know.

477 / Q077 2024 • ADAPTED • ref Q14

The major physiological role of progesterone after ovulation is to:

A. Increase thyroid hormone release
B. Maintain secretory endometrium
C. Stimulate ovulation directly
D. Cause pancreatic insulin release

ANSWER B • Maintain secretory endometrium
WHY Progesterone prepares and maintains the uterine lining for possible implantation.

478 / Q078 2024 • MEMORY-BASED • ref Q24

A woman shows blocked fallopian tubes. Which procedure would you suggest for her to conceive a baby?

A. Amniocentesis
B. IVF
C. ELISA
D. Surgery

ANSWER B • IVF
WHY IVF permits fertilization outside obstructed fallopian tubes, followed by embryo transfer to the uterus.

479 / Q079 2024 • ADAPTED • ref Q40

What is an established evolutionary advantage of the heterozygous HbAS sickle-cell trait in endemic areas?

A. Complete immunity to all malaria
B. Reduced risk of severe falciparum malaria
C. Elimination of all red-cell disorders
D. Prevention of mosquito infection

ANSWER B • Reduced risk of severe falciparum malaria
WHY Heterozygosity can reduce severe malaria risk, helping maintain the allele by balancing selection.

480 / Q080 2023 • MEMORY-BASED • ref Q153

During starvation, which of the following of hydra is highly vacuolated?

A. Musculo-epithelial
B. Musculo-nutritive
C. Secretive cell
D. Gland cell

ANSWER B • Musculo-nutritive
WHY Hydra musculo-nutritive cells participate in digestion and often contain food vacuoles.

481 / Q081 2023 • MEMORY-BASED • ref Q174

Sudden reappearance of ancestral character is:

A. Vestigial organ
B. Atavism
C. Homologous organ
D. Analogous organ

ANSWER B • Atavism
WHY Atavism is the rare reappearance of a trait seen in ancestral organisms.

482 / Q082 2025 • MEMORY-BASED • ref Q99

Iodine deficiency in tadpole causes?

A. Increase in metamorphosis
B. Delay in metamorphosis
C. Stop in metamorphosis
D. Death of the tadpole

ANSWER B • Delay in metamorphosis
WHY Tadpole metamorphosis requires thyroid hormones, whose production needs iodine.

483 / Q083 2025 • MEMORY-BASED • ref Q111

The increasing order of complexity in canal system is?

A. Ascon, Sycon, Leucon
B. Dexcon, sycon, ason
C. Ascon, Leucon, Sycon
D. Sycon, Leucon, Ascon

ANSWER A • Ascon, Sycon, Leucon
WHY Sponge water-canal complexity increases from asconoid to syconoid to leuconoid arrangements.

484 / Q084 2022 • MEMORY-BASED • ref Q14

Horns of Rhinoceros are modified form of

A. Epidermis
B. Mesodermal tissues
C. Odontoblast
D. Matted hairs

ANSWER D • Matted hairs
WHY Rhinoceros horns are made chiefly of densely packed keratin fibers, not bone.

485 / Q085 2022 • MEMORY-BASED • ref Q33

In viral infection the substance secreted in body Is

A. serotonin
B. histamine
C. interferon
D. heparin 5

ANSWER C • interferon
WHY Virus-infected cells may produce interferons, which help neighboring cells activate antiviral defenses.

486 / Q086 2024 • ADAPTED • ref Q4

Which cultural development greatly improved early human survival by providing heat, protection, and food processing?

A. Agriculture before tool use
B. Controlled use of fire
C. Loss of upright posture
D. Loss of speech

ANSWER B • Controlled use of fire
WHY Controlled fire improved warmth, protection, and food preparation during human evolution.

487 / Q087 2024 • MEMORY-BASED • ref Q22

Which vitamin is responsible for maturation of erythrocytes?

A. Vitamin C
B. Vitamin B_{12}
C. Vitamin K
D. Vitamin D

ANSWER B • Vitamin B_{12}
WHY Vitamin B_{12} supports normal DNA synthesis during red-cell maturation.

488 / Q088 2023 • ADAPTED • ref Q155

Which lymphoid organ filters blood and removes senescent erythrocytes?

A. Liver
B. Spleen
C. Jejunum
D. Kidney

ANSWER B • Spleen
WHY The spleen filters blood and removes ageing erythrocytes.

489 / Q089 2023 • ADAPTED • ref Q176

Which exposure is a recognized route of HIV transmission?

A. Casual kissing
B. Sharing utensils
C. Unprotected sexual contact with an infected person
D. Mosquito bite

ANSWER C • Unprotected sexual contact with an infected person
WHY HIV spreads via specific body fluids including blood, semen, vaginal and rectal fluids; casual contact is not a route.

490 / Q090 2022 • MEMORY-BASED • ref Q27

Which part of sperm produce hyaluronidase?

A. Acrosome
B. Mitochondria
C. Centrosome
D. Tail

ANSWER A • Acrosome
WHY Acrosomal enzymes including hyaluronidase aid sperm penetration of coverings around the ovum.

MENTAL AGILITY (MAT) / 10 QUESTIONS

491 / Q091 2023 • MEMORY-BASED • ref Q197

2, 12, 30, 56, ?, 132

A. 49
B. 90
C. 86
D. 102

ANSWER B • 90
WHY Terms follow n(n+1) for odd n: 1×2, 3×4, 5×6, 7×8, 9×10=90, 11×12.

492 / Q092 EXPECTED • CEE-STYLE PRACTICE

The sum of interior angles of a hexagon is:

A. 540°
B. 600°
C. 720°
D. 900°

ANSWER C • 720°
WHY Interior-angle sum = (n−2) × 180° = 4 × 180°.

493 / Q093 EXPECTED • CEE-STYLE PRACTICE

Choose the relationship: SCALPEL : SURGERY :: STETHOSCOPE : ?

A. Auscultation
B. Injection
C. Suturing
D. Casting

ANSWER A • Auscultation
WHY A stethoscope is used for auscultation as a scalpel is used in surgery.

494 / Q094 EXPECTED • CEE-STYLE PRACTICE

If TABLE is coded as UBCMF (each letter shifted +1), CHAIR is coded as:

A. DIBJS
B. DIBIR
C. BGBHQ
D. EJCKT

ANSWER A • DIBJS
WHY Shift every letter one place forward in the alphabet.

495 / Q095 2024 • MEMORY-BASED • reformulated Q8

Ten years ago a mother was four times her daughter's age. Ten years from now she will be twice her daughter's age. What is the daughter's present age?

A. 16
B. 18
C. 20
D. 24

ANSWER C • 20
WHY Let daughter D and mother M. M−10=4(D−10), M+10=2(D+10) gives D=20.

496 / Q096 PYQ-DERIVED • CEE-STYLE PRACTICE

A hospital has 80 patients; 46 received test A, 39 received test B, and 15 received both. How many received neither test?

A. 10
B. 15
C. 20
D. 25

ANSWER A • 10
WHY n(A∪B)=46+39−15=70; neither =80−70=10.

497 / Q097 PYQ-DERIVED • CEE-STYLE PRACTICE

Find the missing term: 3, 8, 15, 24, 35, ?

A. 44
B. 46
C. 48
D. 50

ANSWER C • 48
WHY Successive differences are 5,7,9,11; next difference 13 gives 48.

498 / Q098 PYQ-DERIVED • CEE-STYLE PRACTICE

A person faces east, rotates 270° clockwise, then 90° anticlockwise. Which direction does the person face?

A. North
B. South
C. East
D. West

ANSWER D • West
WHY East→North after 270° clockwise; a 90° anticlockwise turn gives West.

499 / Q099 PYQ-DERIVED • CEE-STYLE PRACTICE

Some medical students are volunteers and all volunteers are trained. Which statement necessarily follows?

A. All students are trained
B. Some medical students are trained
C. No students are volunteers
D. All trained people are students

ANSWER B • Some medical students are trained
WHY The medical students who volunteer belong to the trained set.

500 / Q100 PYQ-DERIVED • CEE-STYLE PRACTICE

In a family, P is the mother of Q; Q is brother of R; R is the mother of S. What relation is P to S?

A. Aunt
B. Grandmother
C. Sister
D. Mother

ANSWER B • Grandmother
WHY P is parent of R, and R is parent of S: P is S’s grandmother.