MDCAT (ETEA entry test, Paper MDCAT-1) — 2019 · Solved Past Paper

Body: Educational Testing and Evaluation Agency (ETEA) · **Post:** MDCAT (ETEA entry test, Paper MDCAT-1) · **Year:** 2019 · **Questions:** 200 in the original paper — **198 solved and verified**, 2 excluded as defective (Q122, Q179) · **Price:** Free

> **How to use this paper:** each question shows the stem, the four options, and the correct answer. Click “Why each option?” under a question to see all four options explained — one question teaches four topics. General Knowledge answers are as of the 2019 sitting.

Source note: Question stems and options: ETEA MDCAT 2019, Paper MDCAT-1 (educationinkarachi.net/wp-content/uploads/2026/09/ETEA-MDCAT-2019.pdf, 30 pp.; Q1-200 contiguous, 4 options each; complete answer-key table at the end, Q1-200). Exam held Sunday 25 August 2019 (KMU schedule announcement: ETEA Medical Entrance Test 2019, 25 Aug 2019, 08:30 a.m.; result report confirms the date). Printed key letter counts A46 / B67 / C47 / D40. Subjects Biology/Chemistry/Physics/English interleaved across Q1-Q200 (no subject sections in the printed paper). 3 PICK-ONE (Q131, Q166, Q173) and 2 DEFECTIVE-excluded (Q122, Q179). Answers verified independently against reference facts, worked derivations and targeted sources, never from the printed key alone. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

Question 1 The genome of influenza virus is

The genome of influenza virus is made up of:

- A. Single strand RNA ✓ **Correct answer**
- B. Double strand DNA
- C. Single strand DNA

ible stranded RNA

A. correct: the influenza virus carries a segmented, single-stranded RNA genome.

B. wrong: influenza is an RNA virus, not a DNA virus.

C. wrong: its genome is RNA, not DNA.

D. wrong: influenza RNA is single-stranded, though it is segmented into eight strands.

Question 2 Galantamine hydrobromide is a compound derived

Galantamine hydrobromide is a compound derived from:

- A. Cannabis
- B. Coca
- C. English yew
- D. Daffodil ✓ **Correct answer**

A. wrong: cannabis yields cannabinoids, not galantamine.

B. wrong: coca yields cocaine, not galantamine.

C. wrong: the yew yields taxol, not galantamine.

D. correct: galantamine is an alkaloid obtained from daffodil (Narcissus) bulbs.

Question 3 Mark the correct match

Mark the correct match:

- A. Haemophilia – Blood cancer
- B. SA node – Pacemaker ✓ **Correct answer**
- C. ECG – Brain
- D. Alpha cell – Insulin

A. wrong: haemophilia is a blood-clotting disorder, not a cancer.

The sinoatrial node is the heart's natural pacemaker.

C. wrong: an ECG records the heart's electrical activity, not the brain's.

D. wrong: alpha cells of the pancreas secrete glucagon; insulin comes from beta cells.

Question 4 Cells which kill cells that display

Cells which kill cells that display foreign motifs on their surface are:

- A. Platelets
- B. Cytotoxic T cells ✓ **Correct answer**
- C. Antigens
- D. Red blood cells

A. wrong: platelets are cell fragments that help blood to clot.

B. correct: cytotoxic (killer) T cells destroy body cells that display foreign antigens on their surface.

C. wrong: antigens are the foreign molecules recognised, not the killer cells.

D. wrong: red cells carry oxygen; they kill nothing.

Question 5 Chitin is a

Chitin is a:

- A. Lipoprotein
- B. Polysaccharide ✓ **Correct answer**
- C. Glycoprotein
- D. Phospholipid

A. wrong: chitin contains no lipid component.

B. correct: chitin is a structural polysaccharide, a polymer of N-acetylglucosamine, forming the exoskeleton of arthropods and fungal walls.

/coproteins are proteins with carbohydrate chains, not chitin.

D. wrong: phospholipids build membranes; chitin is a carbohydrate polymer.

Question 6 Organization of photosynthetic pigments into clusters

Organization of photosynthetic pigments into clusters is:

- A. Photosynthesis
- B. Photosystem ✓ **Correct answer**
- C. Photosynthetic cluster arrangement
- D. Calvin system

A. wrong: photosynthesis is the whole process, not the pigment cluster.

B. correct: a photosystem is a cluster of photosynthetic pigments (chlorophylls and accessory pigments) with a reaction centre.

C. wrong: this is not the standard term.

D. wrong: the Calvin cycle is the light-independent carbon-fixation pathway, not a pigment cluster.

Question 7 Amphibians are poikilotherms therefore they use

Amphibians are poikilotherms, therefore they use to hibernate in:

- A. winter ✓ **Correct answer**
- B. summer
- C. autumn
- D. spring

A. correct: amphibians are poikilotherms (cold-blooded), so in winter they hibernate to survive the cold.

B. wrong: summer dormancy is aestivation, not hibernation.

amphibians become active in autumn before winter sets in.

D. wrong: spring is when hibernating amphibians emerge and breed.

Question 8 All of the following are macronutrients

All of the following are macronutrients except:

- A. Cu ions ✓ **Correct answer**
- B. Ca ions
- C. Mg ions
- D. K ions

A. correct: copper is a micronutrient (trace element) needed only in tiny amounts.

B. wrong: calcium is a macronutrient needed in large amounts.

C. wrong: magnesium is a macronutrient.

D. wrong: potassium is a macronutrient.

Question 9 Sadia wore her rain boots her

Sadia wore her rain boots; _____ her feet stayed dry during the storm.

- A. however
- B. therefore ✓ **Correct answer**
- C. on the other hand
- D. still

A. wrong: however signals a contrast, but dry feet follow from wearing boots.

B. correct: the boots caused the result, so therefore links cause to effect.

C. wrong: this introduces a contrasting alternative, which does not fit.

D. wrong: still concedes something unexpected, but staying dry is the expected result.

10 Anum asked me Did you see

Anum asked me, “Did you see the drama on television last night?” [Choose the correct indirect speech]

- A. Anum asked me whether I saw the drama on television the earlier night.
- B. Anum asked me whether I had seen the drama on television the earlier night. ✓ **Correct answer**
- C. Anum asked me did I see the drama on television the last night.
- D. Anum asked me whether I had seen the drama on television the last night.

A. wrong: in indirect speech the past simple must backshift to the past perfect, so saw is wrong.

B. correct: whether introduces the reported yes/no question, saw backshifts to had seen, and last night becomes the earlier night.

C. wrong: it keeps direct question word order and the unshifted time phrase.

D. wrong: the tense backshifts correctly but last night is left unshifted.

Question 11 A molecule which contains two lone

A molecule which contains two lone pairs and two bond pairs of electrons in valence shell of central atom, geometrical shape of the molecule will be:

- A. Tetrahedral
- B. Trigonal pyramidal
- C. Angular ✓ **Correct answer**
- D. Linear

A. wrong: a tetrahedral shape needs four bond pairs and no lone pairs.

B. wrong: that shape has three bond pairs and one lone pair.

C. correct: two bond pairs and two lone pairs (as in water) give a bent or angular shape.

linear shape needs two bond pairs and no lone pairs.

Question 12 Quantum number which describes the orientation

Quantum number which describes the orientation of orbitals in three dimensional space is:

- A. spin quantum number
- B. azimuthal quantum number
- C. magnetic quantum number ✓ **Correct answer**
- D. principal quantum number

A. wrong: the spin quantum number describes the electron's spin direction.

B. wrong: the azimuthal (l) number describes the subshell shape.

C. correct: the magnetic (m) quantum number gives the orientation of the orbital in three-dimensional space.

D. wrong: the principal (n) number gives the energy level and size.

Question 13 Which one of the following gases

Which one of the following gases has the highest rate of diffusion at the same temperature and pressure?

- A. HCl
- B. CO2
- C. C2H2 ✓ **Correct answer**
- D. C2H6

A. wrong: with a molar mass of 36.5 it diffuses more slowly than the lightest gas here.

B. wrong: at molar mass 44 it is the heaviest and slowest.

C. correct: by Graham's law the rate of diffusion is inversely proportional to the square

r mass, and ethyne (26) is the lightest gas listed.

D. wrong: ethane (30) is heavier than ethyne, so it diffuses more slowly.

Question 14 At higher altitude the boiling point

At higher altitude, the boiling point of water is less than 100°C. This is because of:

- A. higher atmospheric pressure
- B. weak hydrogen bonding
- C. no change in atmospheric pressure
- D. lower atmospheric pressure ✓ **Correct answer**

A. wrong: pressure falls, not rises, with altitude.

B. wrong: the boiling point falls because of external pressure, not because the hydrogen bonds weaken.

C. wrong: atmospheric pressure does change with altitude.

D. correct: at higher altitude the air pressure is lower, so water boils when its vapour pressure reaches that lower value, below 100°C.

Question 15 Substance that has sharp melting point

Substance that has sharp melting point in the following is:

- A. Gemstone
- B. Coal tar
- C. Glass
- D. Diamond ✓ **Correct answer**

A. wrong: gemstone is a vague category, not the sharp-melting-point example here.

B. wrong: coal tar is an amorphous mixture with no sharp melting point.

C. wrong: glass is amorphous and softens over a range of temperatures.

diamond is a crystalline solid with a regular lattice, so it has a sharp melting point.

Question 16 Which of the following pairs is

Which of the following pairs is an example of completely immiscible liquids?

- A. Alcohol and water
- B. Alcohol and ether
- C. Water and ether
- D. Carbon disulphide and water ✓ **Correct answer**

A. wrong: alcohol and water are completely miscible.

B. wrong: alcohol and ether mix freely.

C. wrong: ether is slightly soluble in water, so the pair is only partly immiscible.

D. correct: carbon disulphide and water are completely immiscible liquids.

Question 17 Newton-second is the unit of

Newton-second is the unit of:

- A. Work
- B. Angular momentum
- C. Power
- D. Linear momentum ✓ **Correct answer**

A. wrong: work is measured in joules (newton-metres).

B. wrong: angular momentum is kg m^2/s.

C. wrong: power is measured in watts (joules per second).

D. correct: newton-second equals kg m/s, the unit of linear momentum (and of impulse).

18 The dimension of electric dipole is

The dimension of electric dipole is:

- A. M3L2T0A1
- B. M0L1T1A1 ✓ **Correct answer**
- C. M0L1T1A0
- D. M2L1T3A2

A. wrong: this is not the dimension of charge times distance.

B. correct: an electric dipole moment is charge × distance, so its dimensions are [A T][L] = $M^0L^1T^1A^1$.

C. wrong: it omits the current (ampere) dimension of charge.

D. wrong: this does not match charge × distance.

Question 19 If the velocity of the body

If the velocity of the body becomes half, then kinetic energy of the body becomes:

- A. one fourth ✓ **Correct answer**
- B. double
- C. four times
- D. half

A. correct: kinetic energy is $\frac{1}{2}mv^2$, so halving v quarters the energy.

B. wrong: halving the velocity cannot increase the energy.

C. wrong: that is the result of doubling the velocity, not halving it.

D. wrong: the energy depends on v^2, so it falls to a quarter, not a half.

20 The angular acceleration of second hand

The angular acceleration of second hand of watch is:

- A. π rad/s2
- B. 2π rad/s2
- C. π/2 rad/s2
- D. none of the above ✓ **Correct answer**

A. wrong: the second hand turns at a constant rate, so its angular acceleration is zero, not π rad/s^2.

B. wrong: a constant angular velocity means zero angular acceleration.

C. wrong: again, the angular acceleration is zero.

D. correct: the second hand moves with uniform angular velocity, so its angular acceleration is zero, which is none of the listed values.

Question 21 Purkinje fibres are connected with the

Purkinje fibres are connected with the impulse conducting system of:

- A. heart ✓ **Correct answer**
- B. brain
- C. skin
- D. nephron

A. correct: Purkinje fibres carry the impulse through the ventricles of the heart.

B. wrong: the brain's conducting cells are neurons, not Purkinje fibres.

C. wrong: skin has sensory receptors, not Purkinje fibres.

D. wrong: the nephron is the kidney's filtering unit.

22 The alveoli represent total surface area

The alveoli represent total surface area of:

- A. 10–30 m2
- B. 30–60 m2
- C. 70–90 m2 ✓ **Correct answer**
- D. 90–110 m2

A. wrong: this is far below the alveolar surface area.

B. wrong: this is still below the accepted range.

C. correct: the alveoli together present roughly 70–90 m^2 of surface for gas exchange.

D. wrong: this exceeds the accepted range.

Question 23 Some marine fishes possess salt excreting

Some marine fishes possess salt excreting organs known as:

- A. Thyroid gland
- B. Pituitary gland
- C. Adrenal gland
- D. Rectal gland ✓ **Correct answer**

A. wrong: the thyroid regulates metabolism.

B. wrong: the pituitary is the master endocrine gland.

C. wrong: the adrenal glands release adrenaline and steroids.

D. correct: marine fishes such as sharks excrete excess salt through the rectal gland.

Question 24 Tetanus is the infection of

Tetanus is the infection of:

- B. Nervous system ✓ **Correct answer**
- C. Circulatory system
- D. Bones and muscles

A. wrong: tetanus does not primarily infect the airways.

B. correct: tetanus toxin (from Clostridium tetani) attacks the nervous system, causing muscle spasms and lockjaw.

C. wrong: tetanus is not a blood infection.

D. wrong: the muscles spasm because the nerves are affected, but the infection is of the nervous system.

Question 25 regulates the body temperature

_____ regulates the body temperature.

- A. hypothalamus ✓ **Correct answer**
- B. thalamus
- C. hippocampus
- D. amygdala

A. correct: the hypothalamus contains the body's thermostat and regulates temperature.

B. wrong: the thalamus relays sensory signals.

C. wrong: the hippocampus is involved in memory.

D. wrong: the amygdala processes emotions.

26 A man has to face an

A man has to face an interview, but during the first five minutes before the interview he experiences sweating, increased heart rate and respiration. Which hormones are responsible for his restlessness?

- A. adrenocorticotropic hormone
- B. insulin and glucagon
- C. epinephrine and norepinephrine ✓ **Correct answer**
- D. aldosterone

A. wrong: ACTH acts on the adrenal cortex over hours, not in the first minutes of stress.

B. wrong: these regulate blood glucose, not the stress response.

C. correct: adrenaline and noradrenaline drive the fight-or-flight response — sweating, faster heart rate and faster breathing.

D. wrong: aldosterone regulates salt and water balance, not immediate stress.

Question 27 Hypothalamus is connected to pituitary gland

Hypothalamus is connected to pituitary gland via:

- A. nerves
- B. infundibulum ✓ **Correct answer**
- C. blood
- D. no connection

A. wrong: the link is not a nerve tract.

B. correct: the infundibulum (pituitary stalk) joins the hypothalamus to the pituitary gland.

C. wrong: blood carries hypothalamic releasing factors, but the physical connection is the stalk.

D. wrong: the two are directly connected.

28 Second meiotic division in oocyte is

Second meiotic division in oocyte is completed:

- A. When oocyte is fertilized by sperm ✓ **Correct answer**
- B. When ovum is discharged from the ovary
- C. Just before fertilization
- D. Before the onset of menstruation

A. correct: the secondary oocyte arrests in metaphase II and completes the second meiotic division only after a sperm enters.

B. wrong: ovulation releases a secondary oocyte still in meiosis II.

C. wrong: the division is triggered by fertilization itself, not before it.

D. wrong: meiosis II is not completed at menstruation.

Question 29 Do not make so much noise

Do not make so much noise, Farrah _____ to study for her ESL test!

- A. try
- B. tries
- C. tried
- D. is trying ✓ **Correct answer**

A. wrong: the plain present does not fit an action happening right now.

B. wrong: tries is third-person singular simple present, but the sentence needs the continuous form.

C. wrong: tried is past tense, but Farrah is studying now.

D. correct: the present continuous describes the action in progress at this moment.

30 Zara changed the flat tire Choose

Zara changed the flat tire. [Choose the correct voice]

- A. The flat tire was changed by Zara ✓ **Correct answer**
- B. The flat tire is changed by Zara
- C. The flat tire has been changed by Zara
- D. The flat tire had changed by Zara

A. correct: the past simple active (changed) becomes was changed in the passive.

B. wrong: is changed is present simple, but the original is past.

C. wrong: has been changed is present perfect, not past simple.

D. wrong: this is active past perfect and ungrammatical as a passive.

Question 31 Which one of the following is

Which one of the following is not a state function?

- A. Work ✓ **Correct answer**
- B. Enthalpy
- C. Internal energy
- D. Pressure

A. correct: work is a path function, not a state function, because it depends on how the change is carried out.

B. wrong: enthalpy depends only on the state, so it is a state function.

C. wrong: internal energy depends only on the state.

D. wrong: pressure is a state variable.

32 How many elements are there in

How many elements are there in the third period of the periodic table?

- A. 18
- B. 8 ✓ **Correct answer**
- C. 32
- D. 10

A. wrong: 18 elements fill a period only from the fourth period on.

B. correct: the third period (sodium to argon) contains 8 elements.

C. wrong: 32 elements appear only in the sixth period.

D. wrong: no period has 10 elements.

Question 33 The number of isomers of pentane

The number of isomers of pentane is:

- A. 2
- B. 4
- C. 5
- D. 3 ✓ **Correct answer**

A. wrong: pentane has more than two structural isomers.

B. wrong: there are only three.

C. wrong: there are only three.

D. correct: n-pentane, isopentane (2-methylbutane) and neopentane (2,2-dimethylpropane).

34 When ammonium cyanide NH4CN salt is

When ammonium cyanide (NH4CN) salt is dissolved in water the solution will be:

- A. neutral
- B. acidic
- C. basic ✓ **Correct answer**
- D. both acidic and basic

A. wrong: the salt of a weak acid and a weak base is neutral only when the two hydrolysis effects balance; here they do not.

B. wrong: the cyanide ion hydrolyses more strongly than the ammonium ion.

C. correct: NH4CN is the salt of weak acid HCN and weak base NH4OH, and since Ka(HCN) is smaller than Kb(NH3), the solution is basic (pH about 9).

D. wrong: a salt solution has one pH; this one is basic.

Question 35 The enzyme which is found in

The enzyme which is found in saliva and accelerates the conversion of starch into sugar is:

- A. pepsin
- B. thrombin
- C. ptyalin ✓ **Correct answer**
- D. fumarase

A. wrong: pepsin digests protein in the stomach.

B. wrong: thrombin acts in blood clotting.

C. correct: ptyalin (salivary amylase) in saliva converts starch into sugar.

D. wrong: fumarase acts in the Krebs cycle, not in saliva.

36 Consider the reversible reaction N2 + 3H2

Consider the reversible reaction, N2 + 3H2 ↔️ 2NH3 + Heat. The yield of NH3 will be maximum at:

- A. High temperature and low pressure
- B. High temperature and high pressure
- C. Low temperature and low pressure
- D. Low temperature and high pressure ✓ **Correct answer**

A. wrong: both conditions favour the reverse reaction.

B. wrong: high temperature drives the exothermic forward reaction backwards.

C. wrong: low pressure favours the side with more gas molecules (the reactants).

D. correct: the forward reaction is exothermic and reduces the number of gas molecules (4 to 2), so low temperature and high pressure maximise the ammonia yield.

Question 37 The viscous drag on a small

The viscous drag on a small spherical body (moving with slow speed v) is proportional to:

- A. v ✓ **Correct answer**
- B. square root of v
- C. 1/square root of v
- D. v2

A. correct: by Stokes' law the viscous drag on a slow-moving sphere is $F = 6\pi\eta rv$, directly proportional to v.

B. wrong: the drag is linear in v, not in √v.

C. wrong: drag increases with speed, it does not fall as 1/√v.

D. wrong: the v^2 dependence applies to fast turbulent drag, not slow viscous drag.

38 The transverse nature of light is

The transverse nature of light is shown by:

- A. Interference of light
- B. Refraction of light
- C. Polarization of light ✓ **Correct answer**
- D. Dispersion of light

A. wrong: interference shows the wave nature, not specifically that the waves are transverse.

B. wrong: refraction occurs for longitudinal waves too.

C. correct: only transverse waves can be polarised, so polarisation proves light is transverse.

D. wrong: dispersion shows that refractive index depends on wavelength, not the transverse character.

Question 39 An electron is moving along the

An electron is moving along the axis of a solenoid carrying a current. Which of the following is a correct statement about the magnetic force acting on the electron?

- A. The force acts radially inwards
- B. The force acts radially downwards
- C. The force acts in the direction of motion
- D. No force acts ✓ **Correct answer**

A. wrong: there is no radial force on an electron moving along the axis.

B. wrong: no force acts at all.

C. wrong: a magnetic force is always perpendicular to the velocity.

D. correct: inside a solenoid the field is along the axis, parallel to the electron's velocity, so

Question 40 The motional EMF depends upon

The motional EMF depends upon:

- A. Strength of magnetic field
- B. Speed of the conductor
- C. Length of conductor
- D. All answers are correct ✓ **Correct answer**

A. wrong on its own: the EMF also depends on speed and length.

B. wrong on its own: it is only one of three factors.

C. wrong on its own: it is only one of three factors.

D. correct: the motional EMF is ε = BvL, so it depends on the field strength, the speed and the length.

Question 41 A pure breeding tall plant was

A pure breeding tall plant was crossed to dwarf plant. What would be the probability of “Tt” genotype in F2?

- A. 0
- B. 0.25
- C. 0.5 ✓ **Correct answer**
- D. 0.75

A. wrong: the Tt genotype does appear in the F2.

B. wrong: 0.25 is the probability of TT (and of tt).

C. correct: crossing TT with tt gives all Tt in F1, and the F2 ratio is 1 TT : 2 Tt : 1 tt, so Tt has probability ½.

75 is the probability of the tall phenotype, not the Tt genotype.

Question 42 The number of human spinal nerves

The number of human spinal nerves is:

- A. 60
- B. 62 ✓ **Correct answer**
- C. 64
- D. 66

A. wrong: there are 31 pairs, not 30.

B. correct: humans have 31 pairs of spinal nerves, 62 in total.

C. wrong: that would be 32 pairs.

D. wrong: that would be 33 pairs.

Question 43 Diphtheria vaccine is an example of

Diphtheria vaccine is an example of:

- A. Inactivated vaccine
- B. Toxoid vaccine ✓ **Correct answer**
- C. Subunit vaccine
- D. Live, attenuated vaccine

A. wrong: the diphtheria vaccine is not made from killed bacteria.

B. correct: the diphtheria vaccine is a toxoid, an inactivated bacterial toxin that trains immunity without causing disease.

C. wrong: a subunit vaccine uses a piece of the pathogen, not its inactivated toxin.

D. wrong: the diphtheria vaccine contains no live bacteria.

44 Which one of the following items

Which one of the following items gives its correct total number?

- A. Cervical vertebrae – 7 ✓ **Correct answer**
- B. Floating ribs in human – 3
- C. Auditory ossicles – 8
- D. Cranium bones – 4

A. correct: humans have 7 cervical vertebrae.

B. wrong: there are 2 pairs of floating ribs (11th and 12th).

C. wrong: there are 3 ossicles in each ear, 6 in total.

D. wrong: the cranium is made of 8 bones.

Question 45 Find the mismatch

Find the mismatch:

- A. Thyroid gland – T3 and T4
- B. Parathyroid gland – Calcitonin ✓ **Correct answer**
- C. Pancreas – Insulin
- D. Gonads – Testes and ovaries

A. wrong as a mismatch: the thyroid does secrete T3 and T4, so this pair is correct.

B. correct as the mismatch: the parathyroid secretes parathormone; calcitonin comes from the thyroid's C-cells.

C. wrong as a mismatch: the pancreas (beta cells) does secrete insulin.

D. wrong as a mismatch: the gonads are indeed the testes and ovaries.

46 The simplest form of learning is

The simplest form of learning is:

- A. Imprinting
- B. Insight learning
- C. Latent learning
- D. Habituation ✓ **Correct answer**

A. wrong: imprinting is a rapid, irreversible form of learning, not the simplest.

B. wrong: insight is the most complex form of learning.

C. wrong: latent learning is learning without obvious reward, more complex than habituation.

D. correct: habituation, simply ceasing to respond to a repeated harmless stimulus, is the simplest form of learning.

Question 47 To the end of the first

To the end of the first trimester the embryo can now technically be described as a:

- A. Zygote
- B. Infant
- C. Toddler
- D. Fetus ✓ **Correct answer**

A. wrong: the zygote is the single cell formed at fertilisation.

B. wrong: an infant is a born baby.

C. wrong: a toddler is a young child.

D. correct: by the end of the first trimester (about 8–12 weeks) the embryo is called a fetus.

48 How many pairs of homologous chromosomes

How many pairs of homologous chromosomes are present in Pisum sativum?

- A. Seven pairs ✓ **Correct answer**
- B. Eight pairs
- C. Nine pairs
- D. Ten pairs

A. correct: Pisum sativum (garden pea) has 2n = 14 chromosomes, i.e. seven homologous pairs.

B. wrong: that would be 16 chromosomes.

C. wrong: that would be 18 chromosomes.

D. wrong: that would be 20 chromosomes.

Question 49 Sorry she cant come to the

Sorry she can’t come to the phone. She _____ a bath!

- A. is having ✓ **Correct answer**
- B. having
- C. have
- D. has

A. correct: the present continuous describes what she is doing right now.

B. wrong: having alone is not a finite verb form here.

C. wrong: have does not agree with the third-person singular she.

D. wrong: has a bath would need a different construction (she has a bath every day); for right now, is having is required.

50 Choose the word nearest in meaning

Choose the word nearest in meaning to “ENIGMA”.

- A. Evaluation
- B. puzzle ✓ **Correct answer**
- C. answer
- D. account

A. wrong: evaluation means assessment, not mystery.

B. correct: an enigma is something puzzling or mysterious.

C. wrong: an answer resolves a puzzle; it is the opposite of an enigma.

D. wrong: an account is a report or description.

Question 51 When zinc electrode is coupled with

When zinc electrode is coupled with copper electrode in a galvanic cell:

- A. Reduction takes place at zinc electrode
- B. Oxidation takes place at copper electrode
- C. Reduction takes place at copper electrode ✓ **Correct answer**
- D. Both reduction takes place at zinc electrode and oxidation takes place at copper electrode

A. wrong: zinc is the anode, where oxidation occurs.

B. wrong: copper is the cathode, where reduction occurs.

C. correct: zinc is more reactive, so it oxidises ($Zn \rightarrow Zn^{2+} + 2e^{-}$) and copper ions are reduced at the copper electrode ($Cu^{2+} + 2e^{-} \rightarrow Cu$).

D. wrong: it reverses the two half-reactions.

52 Ozone layer in upper atmosphere is

Ozone layer in upper atmosphere is being destroyed by:

- A. Chlorofluorocarbon
- B. freon
- C. smog
- D. Both (a) and (b) ✓ **Correct answer**

A. wrong on its own: freons are also responsible.

B. wrong on its own: CFCs in general are responsible.

C. wrong: smog does not destroy stratospheric ozone.

D. correct: chlorofluorocarbons, including freons, release chlorine in the stratosphere, which destroys ozone.

Question 53 In the complex potassium hexacyanoferrate III

In the complex potassium hexacyanoferrate (III), K3[Fe(CN)6], the coordination number of Fe is:

- A. 9
- B. 3
- C. 6 ✓ **Correct answer**
- D. 5

A. wrong: there are six cyanide ligands, not nine.

B. wrong: 3 is the number of potassium ions, not the coordination number.

C. correct: the coordination number is the number of ligand donor atoms attached to the metal, and six CN^- ions surround Fe.

D. wrong: there are six cyanide ligands.

54 The compound which has the higher

The compound which has the higher boiling point in the following is:

- A. Methyl chloride
- B. Methyl iodide ✓ **Correct answer**
- C. Methyl bromide
- D. Both (a) and (b)

A. wrong: CH_3Cl has the weakest dispersion forces of the three and the lowest boiling point.

B. correct: boiling point rises with the size of the halogen, and iodine is the largest, giving the strongest London dispersion forces.

C. wrong: CH_3Br boils lower than CH_3I.

D. wrong: only methyl iodide has the highest boiling point.

Question 55 Which one of the following is

Which one of the following is an addition polymer?

- A. Nylon
- B. PVC
- C. Polythene
- D. Both PVC and Polythene ✓ **Correct answer**

A. wrong on its own: nylon is a condensation polymer.

B. wrong on its own: polythene is also an addition polymer.

C. wrong on its own: PVC is also an addition polymer.

D. correct: PVC and polythene are both formed by addition polymerisation, while nylon is formed by condensation.

Question 56 Photochemical smog is primarily caused by

Photochemical smog is primarily caused by:

- A. O3 ✓ **Correct answer**
- B. NO2
- C. SO3
- D. CO2

A. correct: ozone is the principal oxidant of photochemical smog, formed when nitrogen oxides and hydrocarbons react in sunlight.

B. wrong: nitrogen dioxide is a precursor that helps form smog, but ozone is named as the primary agent in this paper.

C. wrong: sulphur trioxide is associated with industrial (London-type) smog, not photochemical smog.

D. wrong: carbon dioxide is a greenhouse gas, not the cause of photochemical smog.

Question 57 Which one of the following physical

Which one of the following physical quantities does not have the dimension of force per unit area?

- A. Stress
- B. Strain ✓ **Correct answer**
- C. Young modulus
- D. Pressure

A. wrong: stress is force per unit area.

B. correct: strain is the ratio of change in length to original length, a pure number with no dimensions, so it has no force-per-area dimension.

C. wrong: Young's modulus is stress/strain, with the dimension of force per unit area.

essure is force per unit area.

Question 58 In the case of germanium the

In the case of germanium, the value of potential barrier that develops across the depletion region is:

- A. 0 V
- B. 0.3 V ✓ **Correct answer**
- C. 0.7 V
- D. 0.9 V

A. wrong: a barrier does develop across the depletion region.

B. correct: the potential barrier for germanium is about 0.3 V (silicon is about 0.7 V).

C. wrong: 0.7 V is the barrier for silicon, not germanium.

D. wrong: no common semiconductor has a 0.9 V barrier.

Question 59 Electron microscope makes practical use of

Electron microscope makes practical use of:

- A. Particle nature of electron
- B. Wave nature of electron ✓ **Correct answer**
- C. Dual nature of electron
- D. None of the above

A. wrong: a microscope that used only the particle nature could not resolve such fine detail.

B. correct: the electron microscope uses the very short de Broglie wavelength of electrons to resolve tiny structures.

C. wrong: the microscope specifically exploits the wave aspect.

e wave nature is the basis of the instrument.

Question 60 A projectile is thrown in such

A projectile is thrown in such a way that its maximum height equals its range, the angle of projection is:

- A. tan-1(45)
- B. tan-1(60)
- C. tan-1(30)
- D. None ✓ **Correct answer**

A. wrong: $\tan^{-1}(45)$ is not the angle for maximum height equal to range.

B. wrong: $\tan^{-1}(60)$ is not the required angle.

C. wrong: $\tan^{-1}(30)$ is not the required angle.

D. correct: when maximum height equals range, $\tan\theta = 4$, so $\theta = \tan^{-1}(4)$; none of the printed options equals $\tan^{-1}(4)$, so None is the answer. Note: the printed options read tan-1(45), tan-1(60) and tan-1(30) exactly as in the source.

Question 61 The percentage of fresh water on

The percentage of fresh water on earth is:

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

A. wrong: this is below the accepted figure.

B. correct: only about 3% of the earth's water is fresh water.

C. wrong: this overstates the fresh-water share.

is overstates the fresh-water share.

Question 62 Recombinants contain DNA from

Recombinants contain DNA from:

- A. 2 different sources ✓ **Correct answer**
- B. Single source
- C. 2 same sources
- D. 3 same sources

A. correct: recombinant DNA is made by joining DNA from two different sources (for example, a human gene into a bacterial plasmid).

B. wrong: DNA from a single source is not recombinant.

C. wrong: the two sources must be different.

D. wrong: recombinants join DNA from two different sources.

Question 63 The inner surface of a kidney

The inner surface of a kidney has a deep notch called:

- A. Renal pelvis
- B. Hilus ✓ **Correct answer**
- C. Medulla
- D. Pyramid

A. wrong: the renal pelvis is the funnel that collects urine inside the kidney, not the notch itself.

B. correct: the hilus (hilum) is the deep notch on the kidney's inner concave surface where vessels and the ureter enter and leave.

C. wrong: the medulla is the kidney's inner tissue layer.

e pyramids are the cone-shaped structures of the medulla.

Question 64 is considered as chief structural and

_____ is considered as chief structural and functional unit of nervous system.

- A. Cell
- B. Neuron ✓ **Correct answer**
- C. Nephron
- D. Brain

A. wrong: the cell is the unit of life in general, not specifically of the nervous system.

B. correct: the neuron is the chief structural and functional unit of the nervous system.

C. wrong: the nephron is the functional unit of the kidney.

D. wrong: the brain is an organ made of neurons, not the unit itself.

Question 65 The bacteriophage replicates only inside the

The bacteriophage replicates only inside the:

- A. animal cell
- B. bacterial cell ✓ **Correct answer**
- C. fungal cell
- D. animal and bacterial cell

A. wrong: a bacteriophage cannot infect animal cells.

B. correct: a bacteriophage (bacteria-eater) replicates only inside a bacterial host cell.

C. wrong: bacteriophages do not infect fungi.

D. wrong: the host range is bacterial only.

66 is stored in animal cells

_____ is stored in animal cells.

- A. starch
- B. cellulose
- C. sucrose
- D. glycogen ✓ **Correct answer**

A. wrong: starch is the storage carbohydrate of plants.

B. wrong: cellulose is a structural carbohydrate of plant walls, not a storage form in animals.

C. wrong: sucrose is a transport sugar in plants.

D. correct: glycogen is the storage polysaccharide of animal cells (liver and muscle).

Question 67 A bacterium which has a group

A bacterium which has a group of two or more flagella inserted at one pole of the cell is:

- A. monotrichous
- B. peritrichous
- C. lophotrichous ✓ **Correct answer**
- D. amphitrichous

A. wrong: monotrichous means a single flagellum at one pole.

B. wrong: peritrichous means flagella all over the cell surface.

C. correct: lophotrichous means a tuft (group) of flagella at one pole.

D. wrong: amphitrichous means one flagellum at each pole.

68 The gametophyte of Lycopsida is mainly

The gametophyte of Lycopsida is mainly:

- A. aerial
- B. partly aerial and partly underground
- C. underground ✓ **Correct answer**
- D. photosynthetic

A. wrong: the Lycopsida gametophyte is not an aerial structure.

B. wrong: it is mainly underground.

C. correct: the gametophyte of Lycopsida (club mosses) is mainly subterranean and non-photosynthetic.

D. wrong: the underground gametophyte does not photosynthesise.

Question 69 When I went back to my

When I went back to my hometown three years ago, I found that a lot of changes _____.

- A. had taken place ✓ **Correct answer**
- B. have taken place
- C. are taken place
- D. were taken place

A. correct: the changes happened before the past visit, so the past perfect is required.

B. wrong: the present perfect does not fit a past-time narrative.

C. wrong: this is ungrammatical (are taken place is not a valid form).

D. wrong: were taken place is ungrammatical and the wrong tense.

70 Choose the correct sentence

Choose the correct sentence:

- A. He is clever but he lacks experiences ✓ **Correct answer**
- B. He is clever but he is lacking experience
- C. He is clever but he is lacked experience
- D. He is clever but he is lack experience

A. correct: this is the only fully grammatical sentence of the four (lacks is the correct finite verb form with the subject he).

B. wrong: lacking is not the correct form with the stative verb lack in this construction.

C. wrong: is lacked is ungrammatical here.

D. wrong: is lack is ungrammatical.

Question 71 Which of the following is not

Which of the following is not the major source of organic compounds?

- A. Natural gas
- B. Petroleum
- C. Coal
- D. Ammoniacal liquor ✓ **Correct answer**

A. wrong as a non-source: natural gas is a major source of organic compounds.

B. wrong as a non-source: petroleum is a major source.

C. wrong as a non-source: coal is a major source.

D. correct: ammoniacal liquor is not a major source of organic compounds.

72 Which of the following concentration units

Which of the following concentration units is temperature dependent?

- A. Molality
- B. Mole fraction
- C. Molarity ✓ **Correct answer**
- D. Both molality and molarity

A. wrong: molality (moles per kg of solvent) does not change with temperature.

B. wrong: mole fraction is a ratio of amounts and is temperature-independent.

C. correct: molarity (moles per litre of solution) changes with temperature because the solution's volume changes.

D. wrong: only molarity is temperature-dependent.

Question 73 Tertiary alcohols are not oxidized into

Tertiary alcohols are not oxidized into carbonyl compounds because:

- A. They contain more alkyl groups
- B. They have no alpha-hydrogen ✓ **Correct answer**
- C. Suitable oxidizing agent is not available
- D. None of the above

A. wrong: the number of alkyl groups is not the reason oxidation fails.

B. correct: a tertiary alcohol's carbon carries no hydrogen, so it cannot be oxidised to a carbonyl compound without breaking a carbon–carbon bond.

C. wrong: strong oxidising agents exist; the structure prevents the reaction.

D. wrong: the absence of an alpha-hydrogen is the reason.

74 Which one is more reactive

Which one is more reactive?

- A. HCHO ✓ **Correct answer**
- B. CH3CHO
- C. (CH3)2CO
- D. Have equal reactivity

A. correct: formaldehyde is the most reactive carbonyl compound — it has no alkyl groups donating electrons or blocking attack.

B. wrong: the methyl group reduces reactivity compared with formaldehyde.

C. wrong: acetone, with two methyl groups, is the least reactive of the three.

D. wrong: reactivity falls from aldehydes to ketones.

Question 75 Which compound shows the highest boiling

Which compound shows the highest boiling point?

- A. CH3COOH ✓ **Correct answer**
- B. C2H5OH
- C. C2H5–O–C2H5
- D. (CH3CH2)3N

A. correct: acetic acid has the highest boiling point because its molecules form strong hydrogen bonds and exist as dimers.

B. wrong: ethanol hydrogen-bonds too, but more weakly than acetic acid.

C. wrong: ether cannot hydrogen-bond with itself, so it boils lowest.

D. wrong: triethylamine has only weak dipole forces and boils below acetic acid.

76 Which of the following pollutants decolorizes

Which of the following pollutants decolorizes the skin?

- A. Mercury
- B. Arsenic ✓ **Correct answer**
- C. Lead
- D. Cadmium

A. wrong: mercury poisoning chiefly affects the nervous system and kidneys, not skin colour.

B. correct: arsenic exposure decolorizes (depigments) the skin, producing pale patches.

C. wrong: lead poisoning causes anaemia and nerve damage, not skin decolorization.

D. wrong: cadmium chiefly damages the kidneys and bones.

Question 77 Car X is travelling at half

Car “X” is travelling at half the speed of car “Y” and the mass of car “X” is twice as compared to the mass of car “Y”. Which of the following statements is correct?

- A. Car “X” has half of the kinetic energy of car “Y” ✓ **Correct answer**
- B. Car “X” has one quarter of the K.E of car “Y”
- C. Car “X” has twice the K.E of car “Y”
- D. The two cars have the same KE

A. correct: KE = ½mv², so for X: ½(2m)(v/2)² = ¼mv², while for Y: ½mv² — X has half of Y's kinetic energy.

B. wrong: the doubled mass partly offsets the halved speed, giving one half, not one quarter.

C. wrong: halving the speed quarters the v² term.

D. wrong: the kinetic energies differ by a factor of two.

78 If the wavelength of a transverse

If the wavelength of a transverse wave is 2 cm and the period is 2 seconds then the wave speed in CGS is:

- A. 0.1 cm s-1
- B. 0.2 cm s-1
- C. 11 cm s-1
- D. 1 cm s-1 ✓ **Correct answer**

A. wrong: 2 cm divided by 2 s is not 0.1 cm/s.

B. wrong: this is not the result of λ/T.

C. wrong: this is not the result of λ/T.

D. correct: wave speed v = λ/T = 2 cm / 2 s = 1 cm/s.

Question 79 A car battery has EMF of

A car battery has EMF of 12 volts and internal resistance 5 × 10-2 ohm. If it draws 60 ampere current, then terminal voltage of the battery will be:

- A. 5 volts
- B. 3 volts
- C. 15 volts
- D. 9 volts ✓ **Correct answer**

A. wrong: 12 − 60 × 0.05 = 9, not 5.

B. wrong: 3 V is the internal drop, not the terminal voltage.

C. wrong: the terminal voltage cannot exceed the EMF.

D. correct: terminal voltage V = E − Ir = 12 − (60 × 0.05) = 12 − 3 = 9 V.

80 The cyclotron frequency of an electron

The cyclotron frequency of an electron projected with velocity V perpendicular to a magnetic field B is given by:

- A. f = mB/πc
- B. f = 2πeB/m
- C. f = eB/2πm ✓ **Correct answer**
- D. f = 2πc/mB

A. wrong: this is not the cyclotron frequency.

B. wrong: this is the angular frequency ω = eB/m multiplied by 2π, not the frequency.

C. correct: the cyclotron frequency is f = eB/(2πm).

D. wrong: this is not the cyclotron frequency.

Question 81 Opossum and koala bear belong to

Opossum and koala bear belong to sub-class:

- A. Prototheria
- B. Eutheria
- C. Metatheria ✓ **Correct answer**
- D. Monotremata

A. wrong: Prototheria are the egg-laying monotremes (platypus, echidna).

B. wrong: Eutheria are the placental mammals.

C. correct: opossum and koala are marsupials, the Metatheria, whose young complete development in a pouch.

D. wrong: Monotremata are the egg-laying mammals of Prototheria.

82 The form of immunity which is

The form of immunity which is inherited from mother is:

- A. active immunity
- B. passive immunity ✓ **Correct answer**
- C. acquired immunity
- D. innate immunity

A. wrong: active immunity is produced by the person's own immune system after infection or vaccination.

B. correct: antibodies passed from mother to child (through the placenta and milk) give passive immunity.

C. wrong: acquired immunity is developed after exposure, not inherited from the mother.

D. wrong: innate immunity is the inborn non-specific defence, not antibodies received from the mother.

Question 83 The least toxic excretory product is

The least toxic excretory product is:

- A. ammonia
- B. urea
- C. uric acid ✓ **Correct answer**
- D. fatty acid

A. wrong: ammonia is the most toxic excretory product.

B. wrong: urea is moderately toxic and needs water for excretion.

C. correct: uric acid is the least toxic nitrogenous waste, excreted as a semi-solid with little water loss.

D. wrong: a fatty acid is not a nitrogenous excretory product at all.

84 Chemically hormones are

Chemically hormones are:

- A. Carbohydrates
- B. proteins
- C. steroids
- D. Both proteins and steroids ✓ **Correct answer**

A. wrong: no hormone is a carbohydrate.

B. wrong on its own: steroid hormones are also common.

C. wrong on its own: many hormones are proteins or peptides.

D. correct: chemically, hormones are mainly proteins/peptides (for example insulin) or steroids (for example testosterone).

Question 85 DNA polymerase III works always in

DNA polymerase III works always in:

- A. 5′ – 2′ direction
- B. 5′ – 3′ direction ✓ **Correct answer**
- C. 3′ – 5′ direction
- D. 2′ – 5′ direction

A. wrong: there is no 2' direction in DNA synthesis.

B. correct: DNA polymerase III always adds nucleotides to the 3' end, synthesising in the 5' to 3' direction.

C. wrong: the template is read 3' to 5', but synthesis proceeds 5' to 3'.

D. wrong: there is no 2' direction in DNA synthesis.

86 The biogas plant is a tank

The biogas plant is a tank which is:

- A. 5–10 ft deep
- B. 10–15 ft deep
- C. 15–20 ft deep ✓ **Correct answer**
- D. 20–25 ft deep

A. wrong: this is shallower than the textbook figure for a biogas plant tank.

B. wrong: this is shallower than the textbook figure.

C. correct: the biogas plant tank is described as 15–20 ft deep.

D. wrong: this is deeper than the textbook figure.

Question 87 Which wavelengths are mainly absorbed by

Which wavelengths are mainly absorbed by chlorophyll?

- A. Violet-blue and red ✓ **Correct answer**
- B. green and blue
- C. violet and orange
- D. red and indigo

A. correct: chlorophyll absorbs most strongly in the violet-blue and red regions and reflects green.

B. wrong: green light is mostly reflected, not absorbed.

C. wrong: the second peak is in the red, not the orange.

D. wrong: the blue peak is violet-blue, and indigo is not the stated region.

88 For hepatitis B the incubation period

For hepatitis B the incubation period is between:

- A. 4 and 20 weeks ✓ **Correct answer**
- B. 6 and 20 weeks
- C. 2–26 weeks
- D. 2–6 weeks

A. correct: the incubation period of hepatitis B is given as 4 to 20 weeks in the textbook used for this paper.

B. wrong: the stated range starts at 4 weeks, not 6.

C. wrong: this is a wider range than the stated one.

D. wrong: this range is far too short for hepatitis B.

Question 89 Look A hamster by the cat

Look! A hamster _____ by the cat.

- A. has been chased
- B. was being chased
- C. is being chased ✓ **Correct answer**
- D. is chased

A. wrong: the present perfect does not match Look!, which signals an action happening now.

B. wrong: the past continuous puts the action in the past.

C. correct: Look! signals an action in progress now, so the present continuous passive is required.

D. wrong: the simple present passive describes a habit, not an action happening now.

90 Choose the word opposite in meaning

Choose the word opposite in meaning to “VOCIFEROUS”.

- A. Silent ✓ **Correct answer**
- B. Boisterous
- C. Blatant
- D. Noisy

A. correct: vociferous means loud and noisy, so its opposite is silent.

B. wrong: boisterous also means loud and unruly, a near-synonym.

C. wrong: blatant means obvious or offensively loud, close in sense to vociferous.

D. wrong: noisy is a synonym of vociferous.

Question 91 Which contains more atoms

Which contains more atoms?

- A. 7 gram Mg
- B. 8 gram Na ✓ **Correct answer**
- C. 9 gram Al
- D. All same

A. wrong: 7/24 = 0.29 mol, fewer atoms than in 8 g of sodium.

B. correct: 8/23 = 0.35 mol, the largest number of moles (hence atoms) of the three.

C. wrong: 9/27 = 0.33 mol, fewer atoms than in 8 g of sodium.

D. wrong: the mole amounts differ.

Question 92 Which contains the highest percentage of

Which contains the highest percentage of nitrogen?

- B. NO2
- C. N2O ✓ **Correct answer**
- D. N2O5

A. wrong: nitrogen is 14/30 = 46.7% of NO by mass.

B. wrong: nitrogen is 14/46 = 30.4% of NO2.

C. correct: nitrogen is 28/44 = 63.6% of N2O, the highest of the four.

D. wrong: nitrogen is 28/108 = 25.9% of N2O5.

Question 93 Fe2 will form the most ionic

Fe2+ will form the most ionic bond with:

- A. N3-
- B. S2-
- C. P3-
- D. F- ✓ **Correct answer**

A. wrong: nitrogen is less electronegative than fluorine, so the bond is less ionic.

B. wrong: sulphur is less electronegative than fluorine.

C. wrong: phosphorus is less electronegative than fluorine.

D. correct: fluorine is the most electronegative element, so it forms the most ionic bond with Fe^{2+}.

Question 94 For exothermic reversible reaction activation energy

For exothermic reversible reaction activation energy for forward direction depends upon:

- A. Temperature

ure of reactant ✓ **Correct answer**

- C. Nature of product
- D. Both temperature and nature of reactant

A. wrong: temperature changes the rate, not the activation energy.

B. correct: the activation energy depends on the nature of the reactants and the reaction pathway.

C. wrong: the forward activation energy is set by the reactants, not the products.

D. wrong: temperature does not change the activation energy.

Question 95 As the polarizing power of cation

As the polarizing power of cation increases thermal stability of carbonates:

- A. increases
- B. decreases ✓ **Correct answer**
- C. not dependent
- D. depends upon pressure

A. wrong: a more polarising cation distorts the carbonate ion more, making it less stable.

B. correct: as the polarising power of the cation increases, the thermal stability of the carbonate decreases.

C. wrong: stability does depend on polarising power.

D. wrong: the deciding factor here is polarising power, not pressure.

Question 96 Which one is more reactive

Which one is more reactive?

- A. Ester
- B. Acid halide ✓ **Correct answer**

- D. Acid anhydride

A. wrong: esters are less reactive toward nucleophiles than acid halides.

B. correct: acid halides are the most reactive carboxylic acid derivatives because the halide is a good leaving group.

C. wrong: amides are the least reactive of these derivatives.

D. wrong: anhydrides are reactive, but less so than acid halides.

Question 97 If A B AB then the

If A · B = ½ AB then the angle between A and B is:

- A. zero
- B. 30°
- C. 60° ✓ **Correct answer**
- D. 90°

A. wrong: a zero angle would give A·B = AB.

B. wrong: cos 30° is about 0.87, not ½.

C. correct: A·B = AB cos θ = ½AB gives cos θ = ½, so θ = 60°.

D. wrong: at 90° the dot product is zero.

Question 98 A train is 200 m long

A train is 200 m long and is moving with uniform velocity of 36 km/h. The time it will take to cross a bridge of 1 km is:

- A. 100 sec
- B. 120 sec ✓ **Correct answer**
- C. 60 sec

A. wrong: the train must clear its own length plus the bridge (1200 m), not 1000 m.

B. correct: distance = 200 + 1000 = 1200 m, speed = 36 km/h = 10 m/s, so time = 1200/10 = 120 s.

C. wrong: this would be the time for 600 m only.

D. wrong: this is far too short for 1200 m at 10 m/s.

Question 99 Choose the wrong statement The escape

Choose the wrong statement. The escape velocity of a body from a planet depends upon:

- A. The mass of the body ✓ **Correct answer**
- B. The mass of the planet
- C. The average radius of the planet
- D. The density of the planet

A. correct as the wrong statement: escape velocity $v = \sqrt{(2GM/R)}$ does not depend on the mass of the escaping body.

B. wrong as a wrong statement: escape velocity does depend on the planet's mass.

C. wrong as a wrong statement: escape velocity does depend on the planet's radius.

D. wrong as a wrong statement: escape velocity depends on the planet's mass and radius, hence on its density.

Question 100 In order to increase the stopping

In order to increase the stopping potential, there should be an increase in:

- A. Intensity of radiation
- B. Wavelength

quency of radiation ✓ **Correct answer**

- D. Both wavelength and intensity

A. wrong: intensity changes the number of photoelectrons, not the stopping potential.

B. wrong: increasing the wavelength lowers the photon energy and the stopping potential.

C. correct: the stopping potential depends on the maximum kinetic energy, which rises with the frequency of the incident light.

D. wrong: neither raising the wavelength nor raising the intensity raises the stopping potential.

Question 101 Sulphur bacteria belong to the sub-group

Sulphur bacteria belong to the sub-group of bacteria called:

- A. Beta-proteobacteria
- B. Alpha-proteobacteria
- C. Gamma-proteobacteria ✓ **Correct answer**
- D. Delta-proteobacteria

A. wrong: sulphur bacteria are not placed in the beta group.

B. wrong: the alpha group includes nitrogen-fixing and photosynthetic bacteria, not the sulphur bacteria.

C. correct: sulphur bacteria (such as Thiobacillus and Beggiatoa) belong to the gamma-proteobacteria.

D. wrong: the delta group includes myxobacteria and sulphate-reducers, not the sulphur oxidisers.

102 Nuclear mitosis occurs in

Nuclear mitosis occurs in:

- A. Plants
- B. Animals
- C. Fungi ✓ **Correct answer**
- D. Monera

A. wrong: plant mitosis is open — the nuclear envelope breaks down.

B. wrong: animal mitosis is open as well.

C. correct: fungi undergo closed (nuclear) mitosis, in which the nuclear envelope stays intact and division occurs inside the nucleus.

D. wrong: Monera (bacteria) do not undergo mitosis at all; they divide by binary fission.

Question 103 Excess glucose is converted in the

Excess glucose is converted in the liver to glycogen in response to the hormone:

- A. Glucagon
- B. Insulin ✓ **Correct answer**
- C. Bile
- D. Both glucagon and insulin

A. wrong: glucagon breaks glycogen down into glucose.

B. correct: insulin, released when blood glucose is high, promotes the conversion of excess glucose into glycogen in the liver.

C. wrong: bile is not a hormone and does not make glycogen.

D. wrong: glucagon has the opposite effect to insulin here.

104 During muscle relaxation the calcium ions

During muscle relaxation the calcium ions are:

- A. Released from sarcoplasmic reticulum into sarcoplasm
- B. Forced back from the sarcoplasm to sarcoplasmic reticulum ✓ **Correct answer**
- C. Further forced from sarcoplasmic reticulum into sarcoplasm
- D. Neither released more nor forced back but remain constant

A. wrong: release of calcium triggers contraction, not relaxation.

B. correct: during relaxation, calcium ions are actively pumped back into the sarcoplasmic reticulum, so the muscle relaxes.

C. wrong: more calcium in the sarcoplasm would sustain contraction.

D. wrong: relaxation requires calcium to be removed from the sarcoplasm.

Question 105 In male luteinizing hormone is also

In male, luteinizing hormone is also known as:

- A. ACTH
- B. CSH (ICSH) ✓ **Correct answer**
- C. TRF
- D. MSH

A. wrong: ACTH (adrenocorticotropic hormone) acts on the adrenal cortex.

B. correct: in males, luteinizing hormone is called interstitial cell-stimulating hormone (ICSH), which stimulates the interstitial cells of the testes.

C. wrong: TRF (thyrotropin-releasing factor) acts on the pituitary to release TSH.

D. wrong: MSH (melanocyte-stimulating hormone) acts on skin pigment cells.

106 A particular amino acid and RNA

A particular amino acid and RNA molecule bind together by the action of an enzyme named:

- A. tRNA synthetase
- B. Amino tRNA synthetase
- C. tRNA ligase
- D. Aminoacyl tRNA synthetase ✓ **Correct answer**

A. wrong: this is an incomplete form of the enzyme's name.

B. wrong: this is an incomplete form of the name.

C. wrong: a ligase joins nucleic acid fragments; it does not attach amino acids to tRNA.

D. correct: aminoacyl-tRNA synthetase joins a specific amino acid to its tRNA molecule.

Question 107 Lipid bilayer makes the membrane a

Lipid bilayer makes the membrane a differentially permeable barrier that allows the transport of:

- A. Ionic materials
- B. Polar materials
- C. Non-polar materials ✓ **Correct answer**
- D. Glycoproteins

A. wrong: ions cannot cross the lipid bilayer freely; they need channels or carriers.

B. wrong: polar molecules are repelled by the hydrophobic lipid core.

C. correct: the lipid bilayer is permeable to small non-polar (lipid-soluble) molecules, which dissolve through it.

D. wrong: glycoproteins are large membrane components, not substances transported through the bilayer.

108 The following are sexual reproduction methods

The following are sexual reproduction methods in bacteria except:

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

A. wrong as an exception: transformation (uptake of foreign DNA) is a form of genetic exchange in bacteria.

B. wrong as an exception: transduction (gene transfer by a virus) is a form of genetic exchange.

C. correct as the exception: binary fission is asexual reproduction, not a sexual method.

D. wrong as an exception: conjugation (direct DNA transfer between cells) is a form of genetic exchange.

Question 109 Im sorry the house is not

I’m sorry the house is not available any longer, it _____ to a timber tycoon.

- A. was being sold
- B. will be sold
- C. is sold
- D. has been sold ✓ **Correct answer**

A. wrong: the past continuous does not fit — the sale is already complete.

B. wrong: the house is already unavailable, so the sale is not in the future.

C. wrong: the simple present passive does not convey the completed sale.

D. correct: the present perfect passive shows the sale is complete, which is why the house is no longer available.

110 I always liked to lean the

I always liked to lean ___ the side of mercy.

- A. over
- B. on ✓ **Correct answer**
- C. towards
- D. about

A. wrong: lean over means to bend over something, not to favour mercy.

B. correct: the idiom is to lean on the side of mercy.

C. wrong: lean towards means to incline in a direction, not the set idiom used here.

D. wrong: lean about is not an idiom.

Question 111 Which of the following elements has

Which of the following elements has the lowest first ionization energy?

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

A. wrong: nitrogen has the highest first ionisation energy of the four (half-filled p subshell).

B. wrong: oxygen's first ionisation energy is higher than boron's.

C. wrong: carbon's first ionisation energy is higher than boron's.

D. correct: boron has the lowest first ionisation energy of the four (about 801 kJ/mol), lower than carbon, oxygen and nitrogen.

112 The anhydride of HClO4 is

The anhydride of HClO4 is:

- A. ClO3
- B. ClO2
- C. Cl2O5
- D. Cl2O7 ✓ **Correct answer**

A. wrong: ClO3 is not the anhydride of perchloric acid.

B. wrong: ClO2 is the anhydride of chlorous acid.

C. wrong: Cl2O5 is the anhydride of chloric acid.

D. correct: dichlorine heptoxide, Cl2O7, is the anhydride of perchloric acid, HClO4.

Question 113 A gas diffuses half as fast

A gas diffuses half as fast as hydrogen; its molecular mass is:

- A. 50 amu
- B. 25 amu
- C. 16 amu
- D. 8 amu ✓ **Correct answer**

A. wrong: this would diffuse far more slowly than half the rate of hydrogen.

B. wrong: this would diffuse at about 0.28 times the hydrogen rate.

C. wrong: a mass of 16 would diffuse at about 0.35 times the hydrogen rate.

D. correct: by Graham's law, rate ∝ 1/√M, so half the rate of hydrogen (M = 2) means M = 2 × 4 = 8 amu.

114 Which one of the following ions

Which one of the following ions has more electrons than protons and more protons than neutrons?

- A. D
- B. D-
- C. H- ✓ **Correct answer**
- D. He

A. wrong: deuterium has 1 electron, 1 proton and 1 neutron — none of the stated inequalities holds.

B. wrong: D^- has 2 electrons and 1 proton (more electrons than protons), but its 1 proton is not more than its 1 neutron.

C. correct: the hydride ion has 2 electrons (more than its 1 proton) and 1 proton (more than its 0 neutrons).

D. wrong: helium has 2 electrons, 2 protons and 2 neutrons — all equal.

Question 115 Ice and water are in equilibrium

Ice and water are in equilibrium with each other (ice ↔️ water). By increasing the pressure the equilibrium will shift in:

- A. Forward direction ✓ **Correct answer**
- B. Reverse direction
- C. to all system at equilibrium
- D. None of the above

A. correct: increasing pressure favours the side with the smaller volume, and water occupies less volume than ice, so the equilibrium shifts toward water.

B. wrong: that would favour the larger-volume ice.

s is not a meaningful direction of shift.

D. wrong: the forward shift is the correct answer.

Question 116 Steam causes more severe burns than

Steam causes more severe burns than boiling water. It is due to:

- A. Absence of hydrogen bonding
- B. High latent heat of vaporization ✓ **Correct answer**
- C. Freely moving molecules
- D. Statement is incorrect

A. wrong: steam does contain hydrogen bonding; this is not the reason.

B. correct: steam carries the large latent heat of vaporisation, which is released on the skin in addition to the heat of the boiling water, so the burn is more severe.

C. wrong: molecular motion is not the reason for the extra severity.

D. wrong: the statement is correct — steam does cause more severe burns.

Question 117 A two meter high tank is

A two meter high tank is full of water. A hole is made in the middle of the tank. The speed of efflux is:

- A. 4.9 m/s
- B. 9.8 m/s
- C. 4.42 m/s ✓ **Correct answer**
- D. 3.75 m/s

A. wrong: this would be the speed for a 1.22 m head, not 1 m.

B. wrong: this is g, not the efflux speed.

C. correct: by Torricelli's law $v = \sqrt{2gh}$ with $h = 1$ m (the hole is halfway down a 2 m tank),

× 1) ≈ 4.42 m/s.

D. wrong: this does not match √(2gh) for h = 1 m.

Question 118 A hail and a rain drop

A hail and a rain drop of the same radius are released from the same height, the rain drop will reach:

- A. Before hail
- B. After hail ✓ **Correct answer**
- C. At the same time
- D. None of the above

A. wrong: the rain drop does not reach first.

B. correct: the solid hailstone keeps its shape and falls faster, while the rain drop flattens as it falls and meets more air resistance, so the rain drop arrives after the hail.

C. wrong: air resistance affects the two differently, so they do not arrive together.

D. wrong: the rain drop arriving after the hail is the correct answer.

Question 119 Two springs A and B kA

Two springs A and B (kA = 2kB) are stretched by applying forces of equal magnitudes at the free ends. If the energy stored in A is E then the energy stored in B is:

- A. E/2
- B. 2E ✓ **Correct answer**
- C. E
- D. E/4

A. wrong: the energy is larger in the weaker spring, not smaller.

B. correct: with the same force F, the extension is x = F/k and the stored energy is $F^2/(2k)$,

g with half the spring constant stores twice the energy.

C. wrong: the energies differ because the spring constants differ.

D. wrong: the energy ratio is 2, not ¼.

Question 120 The general form of path difference

The general form of path difference in Young's double slit experiment is "mλ". Its corresponding phase shift (in radians) is:

- A. mπ
- B. 2mπ ✓ **Correct answer**
- C. mπ/2
- D. None

A. wrong: the phase shift is 2π per wavelength of path difference, not π.

B. correct: phase shift = (2π/λ) × path difference = (2π/λ)(mλ) = 2mπ radians.

C. wrong: this understates the phase shift by a factor of four.

D. wrong: 2mπ is the correct phase shift.

Question 121 Lichen is the symbiotic association of

Lichen is the symbiotic association of a fungus with:

- A. Bacteria
- B. algae ✓ **Correct answer**
- C. other fungus
- D. animals

A. wrong: a lichen is a fungus plus an alga, not a bacterium.

B. correct: a lichen is the symbiotic association of a fungus with an alga (the alga photosynthesises and the fungus provides structure and protection).

o fungi together do not make a lichen.

D. wrong: no animal is part of a lichen.

Question 122 The possible reason for cyanosis one

The possible reason for cyanosis, one of congenital heart disease, is:

- A. formation of carboxyhemoglobin
- B. the high concentration of oxyhemoglobin
- C. low level of CO
- D. low level of hemoglobin

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

A. The printed key: wrong. Carboxyhaemoglobin is formed when carbon monoxide binds haemoglobin; it makes the skin cherry-red, not blue.

B. Wrong: a high concentration of oxyhaemoglobin keeps the blood bright red and prevents cyanosis.

C. Wrong: a low level of carbon monoxide has nothing to do with cyanosis.

D. Wrong: a low haemoglobin level causes pallor (anaemia), not cyanosis. (DEFECTIVE-excluded: cyanosis is caused by an excess of deoxygenated (reduced) haemoglobin in the blood; that cause is not offered among the options, and the printed key A (carboxyhaemoglobin) is wrong — carboxyhaemoglobin causes a cherry-red colour, the opposite of cyanosis. No option is correct, so the item is excluded. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 123 The deficiency of which micronutrient causes

The deficiency of which micronutrient causes goiter formation?

- A. Iron

- C. Iodine ✓ **Correct answer**
- D. Sodium

A. wrong: iron deficiency causes anaemia, not goitre.

B. wrong: zinc deficiency affects growth and immunity, not the thyroid.

C. correct: iodine is needed to make thyroid hormones, and its deficiency enlarges the thyroid (goitre).

D. wrong: sodium deficiency does not cause goitre.

Question 124 Phosphatases belong to which group of

Phosphatases belong to which group of the following?

- A. Lyases
- B. Ligases
- C. Hydrolases ✓ **Correct answer**
- D. None

A. wrong: lyases break bonds without water.

B. wrong: ligases join molecules using ATP.

C. correct: phosphatases remove phosphate groups by hydrolysis, so they are hydrolases.

D. wrong: phosphatases are hydrolases.

Question 125 The ribosomes responsible for protein synthesis

The ribosomes responsible for protein synthesis are present in the cell:

- A. floating in the cytosol
- B. localized in the nucleus
- C. bound to rough endoplasmic reticulum ✓ **Correct answer**

h floating in the cytosol and bound to rough endoplasmic reticulum ✓
Correct answer

A. wrong on its own: ribosomes are also bound to the rough endoplasmic reticulum.

B. wrong: ribosomes are not found in the nucleus.

C. wrong on its own: free ribosomes also float in the cytosol.

D. correct: ribosomes occur both free in the cytosol (making proteins for the cell) and bound to the rough ER (making proteins for export).

Question 126 enzyme needs a primer for the

_____ enzyme needs a primer for the initiation of its function.

- A. RNA polymerase
- B. DNA polymerase ✓ **Correct answer**
- C. Primase
- D. Ligase

A. wrong: RNA polymerase starts a new RNA chain without a primer.

B. correct: DNA polymerase cannot start a new strand on its own; it needs a primer to begin synthesis.

C. wrong: primase is the enzyme that makes the primer, not the one that needs it.

D. wrong: ligase joins DNA fragments; it needs no primer.

Question 127 The following histone proteins form a

The following histone proteins form a nucleosome complex except:

- A. H1 ✓ **Correct answer**
- B. H2A
- C. H2B

A. correct as the exception: the nucleosome core is made of H2A, H2B, H3 and H4 (two copies each); H1 is the linker histone that sits outside the core particle.

B. wrong as an exception: H2A is part of the core octamer.

C. wrong as an exception: H2B is part of the core octamer.

D. wrong as an exception: H3 is part of the core octamer.

Question 128 The bond that is formed between

The bond that is formed between two monosaccharide units is called:

- A. Ionic bond
- B. Hydrogen bond
- C. Peptide bond
- D. Glycosidic bond ✓ **Correct answer**

A. wrong: monosaccharides are joined by a covalent bond, not an ionic one.

B. wrong: hydrogen bonds hold structures together but do not join sugar units.

C. wrong: peptide bonds join amino acids, not sugars.

D. correct: two monosaccharides are joined by a glycosidic bond (with the loss of a water molecule).

Question 129 They already some of the old

They already ____ some of the old ones and ____ them more comfortable.

- A. repair, make
- B. repaired, made ✓ **Correct answer**
- C. repaired, make
- D. repair, made

already requires the past tense, not the present.

B. correct: both verbs must be past tense to match already.

C. wrong: the two verbs must agree in tense; make should be made.

D. wrong: repair should be repaired to match already.

Question 130 I was born in Peshawar but

I was born in Peshawar but most of my childhood _____ in Mardan.

- A. spends
- B. have spent
- C. was spent ✓ **Correct answer**
- D. is spending

A. wrong: spends is present tense and cannot follow was born in a past narrative.

B. wrong: have spent is present perfect and does not fit the past passive construction.

C. correct: childhood was spent in Mardan is the correct past passive form.

D. wrong: is spending is present continuous and does not fit.

Question 131 Which oxides of K contain more

Which oxides of “K” contain more oxygen than its normal oxide?

- A. Peroxide
- B. Superoxide ✓ **Correct answer**
- C. Both contain equal quantity
- D. None of the above

A. Also correct on the wording as printed: potassium peroxide (K_2O_2) contains more oxygen than the normal oxide K_2O (one oxygen per potassium against one per two potassiums).

er the printed key: potassium superoxide (KO_2) contains two oxygens per potassium, the most oxygen of the oxides listed.

C. Wrong: peroxide and superoxide do not contain equal quantities of oxygen.

D. Wrong: both peroxide and superoxide contain more oxygen than the normal oxide. (PICK-ONE: the stem asks which oxides contain more oxygen than the normal oxide, and both peroxide (A) and superoxide (B) do; the printed key records B, which is the oxide with the most oxygen. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 132 A gas decolorized alkaline KMnO4 solution

A gas decolorized alkaline $KMnO_4$ solution but does not give any precipitate with ammoniacal $AgNO_3$. The gas is:

- A. Methane
- B. Ethylene ✓ **Correct answer**
- C. Ethane
- D. None of the above

A. wrong: methane (an alkane) does not decolorize alkaline $KMnO_4$.

B. correct: ethylene (an alkene) decolorizes alkaline $KMnO_4$, and unlike a terminal alkyne it gives no precipitate with ammoniacal silver nitrate.

C. wrong: ethane (an alkane) does not decolorize alkaline $KMnO_4$.

D. wrong: ethylene fits both tests.

Question 133 Why is ethanoic acid a stronger

Why is ethanoic acid a stronger acid in liquid ammonia than in water?

- A. Ammonia is a stronger base than water ✓ **Correct answer**
- B. Ethanoic acid molecules form H-bonding with water
- C. Ethanoic acid is more soluble in liquid ammonia than in water

A. correct: ammonia accepts the proton from ethanoic acid more readily than water does, so the acid ionises further and behaves as a stronger acid in liquid ammonia.

B. wrong: hydrogen bonding with water does not make the acid weaker.

C. wrong: solubility is not the reason for the greater acidity.

D. wrong: the stronger basicity of ammonia is the reason.

Question 134 Which ions are used as catalyst

Which ions are used as catalyst in the reaction between persulfate ions and iodide ions?

- A. Lead
- B. Iron ✓ **Correct answer**
- C. Copper
- D. Chromium

A. wrong: lead ions do not catalyse this reaction.

B. correct: iron ions (Fe^{2+}/Fe^{3+}) catalyse the reaction between persulfate and iodide ions (the classic iodine-clock catalysis).

C. wrong: copper ions are not the catalyst here.

D. wrong: chromium ions are not the catalyst here.

Question 135 Which one is a stronger nucleophile

Which one is a stronger nucleophile?

- A. $C_2H_5O^-$
- B. $C_2H_5S^-$ ✓ **Correct answer**
- C. both are equally strong
- D. none of the above

…e ethoxide ion is the weaker nucleophile of the two.

B. correct: the thiolate ion is a stronger nucleophile because sulphur is larger and more polarisable than oxygen, so it donates its electron pair more readily.

C. wrong: the sulphur nucleophile is stronger.

D. wrong: the thiolate ion is the stronger nucleophile.

Question 136 Which one of the following elements

Which one of the following elements has the largest second ionization energy?

- A. O
- B. F
- C. Na ✓ **Correct answer**
- D. N

A. wrong: oxygen's second ionisation energy is high, but not the largest here.

B. wrong: fluorine's second ionisation energy is high, but sodium's is larger.

C. correct: removing a second electron from Na^+ breaks the stable neon octet, so sodium has the largest second ionisation energy of the four.

D. wrong: nitrogen's second ionisation energy is lower than sodium's.

Question 137 An alpha-particle is accelerated through a

An α-particle is accelerated through a potential difference of 10 volts. Its K.E is:

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

A. wrong: an alpha particle (charge 2e) through 10^6 V gains 2 MeV, not 1 MeV.

netic energy = qV = 2e × 10⁶ V = 2 MeV.

C. wrong: 4 MeV would need a 2×10^6 V potential difference.

D. wrong: 8 MeV would need a 4×10^6 V potential difference. Note: the stem as served prints "10 volts" while the options and the key are in MeV; the intended potential difference is 10^6 volts, the superscript having been lost in the source reproduction (the same class of typesetting slip as the 37yz Q99 precedent).

Question 138 If there are n capacitors each

If there are “n” capacitors each of capacity “C” connected in parallel to “V” volts source then energy stored is equal to:

- A. CV
- B. ½ nCV2 ✓ **Correct answer**
- C. CV2
- D. CV2/2n

A. wrong: this is the charge on one capacitor, not the stored energy.

B. correct: n capacitors in parallel have total capacitance nC, so the stored energy is $\tfrac{1}{2}(nC)V^2 = \tfrac{1}{2}nCV^2$.

C. wrong: this omits both the factor ½ and the number of capacitors.

D. wrong: the energy grows with n, it is not divided by n.

Question 139 The electric field strength between a

The electric field strength between a pair of plates is “E”. If the separation of the plates is doubled and potential difference between the plates is increased by a factor of four, the new field strength is:

- A. E
- B. 2E ✓ **Correct answer**

- D. 8E

A. wrong: the field changes when V and d change.

B. correct: E = V/d, so the new field is 4V/(2d) = 2(V/d) = 2E.

C. wrong: doubling the separation halves the effect of the quadrupled voltage.

D. wrong: this multiplies the factors instead of dividing by the doubled separation.

Question 140 Two satellites of masses 3M and

Two satellites of masses “3M” and “M” orbit the earth in circular orbits of radius “r” and “3r” respectively, the ratio of their speeds is:

- A. 1 : 1
- B. √3 : 1 ✓ **Correct answer**
- C. 3 : 1
- D. 9 : 1

A. wrong: the orbital speed depends on the radius, so the speeds differ.

B. correct: orbital speed v = √(GM/r), so $v_1/v_2 = \sqrt{(r_2/r_1)} = \sqrt{(3r/r)} = \sqrt{3}$; the masses of the satellites do not matter.

C. wrong: the speed ratio is the square root of the radius ratio, not the ratio itself.

D. wrong: this is the square of the radius ratio, not the speed ratio.

Question 141 The optimum pH of enzyme urease

The optimum pH of enzyme urease is:

- A. 7.8–8.7
- B. 7.0 ✓ **Correct answer**
- C. 4.5

A. wrong: this range is above the optimum for urease.

B. correct: the optimum pH of the enzyme urease is 7.0.

C. wrong: this acidic pH is far from the urease optimum.

D. wrong: this is above the urease optimum.

Question 142 Which statement about chlorophyll is not

Which statement about chlorophyll is not true?

- A. It contains terminal carbonyl group ✓ **Correct answer**
- B. It contains phytol tail
- C. It contains porphyrin ring
- D. It contains magnesium

A. correct as the not-true statement: chlorophyll a, the main photosynthetic pigment, has no terminal carbonyl (aldehyde) group.

B. wrong as a not-true statement: chlorophyll does have a long phytol tail.

C. wrong as a not-true statement: chlorophyll does have a porphyrin ring.

D. wrong as a not-true statement: chlorophyll does contain a central magnesium atom.

Question 143 In humans the disease symptoms develop

In humans the disease symptoms develop during the:

- A. log phase ✓ **Correct answer**
- B. lag phase
- C. growth phase
- D. decline phase

sease symptoms develop during the log (exponential) phase, when the pathogen multiplies rapidly and reaches numbers large enough to cause illness.

B. wrong: in the lag phase the pathogen is adapting and numbers are still low, so symptoms have not yet appeared.

C. wrong: growth phase is a vague term; the specific phase is the log phase.

D. wrong: in the decline phase numbers are falling and symptoms are resolving.

Question 144 Independent gametophyte and sporophyte are found

Independent gametophyte and sporophyte are found in:

- A. Selaginella
- B. Polytrichum
- C. Ectocarpus ✓ **Correct answer**
- D. Liverworts

A. wrong: in Selaginella the sporophyte dominates and the gametophyte is reduced.

B. wrong: in the moss Polytrichum the gametophyte dominates.

C. correct: Ectocarpus (a brown alga) has isomorphic alternation of generations, with independent gametophyte and sporophyte.

D. wrong: in liverworts the gametophyte dominates and the sporophyte depends on it.

Question 145 Tmesipteris is an example of

Tmesipteris is an example of:

- A. horsetail
- B. club mosses
- C. Psilopsida ✓ **Correct answer**
- D. Pteropsida

rsetails are the sphenopsids (Equisetum), not Tmesipteris.

B. wrong: club mosses are the lycopsids.

C. correct: Tmesipteris is a whisk fern, a member of the Psilopsida.

D. wrong: Pteropsida are the true ferns.

Question 146 The larva formed during the life

The larva formed during the life cycle of Annelida is:

- A. Glochidium larva
- B. Bipinnaria larva
- C. Trochophore larva ✓ **Correct answer**
- D. Tornaria larva

A. wrong: the glochidium is the larva of freshwater mussels (molluscs).

B. wrong: the bipinnaria is the larva of starfish (echinoderms).

C. correct: the trochophore is the free-swimming larva of annelids (and molluscs).

D. wrong: the tornaria is the larva of acorn worms (hemichordates).

Question 147 Ebners glands on the dorsal surface

Ebner’s glands on the dorsal surface of the tongue secrete an enzyme:

- A. Amylase
- B. Ptyalin
- C. Lingual lipase ✓ **Correct answer**
- D. Both amylase and ptyalin

A. wrong: Ebner's glands do not secrete amylase.

B. wrong: ptyalin is salivary amylase from the salivary glands, not Ebner's glands.

ebner's glands on the tongue secrete lingual lipase, which begins fat digestion.

D. wrong: neither amylase nor ptyalin comes from Ebner's glands.

Question 148 Antibodies consist of polypeptide chains

Antibodies consist of _____ polypeptide chains.

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

A. wrong: an antibody has two heavy chains as well as two light chains.

B. correct: an antibody molecule consists of four polypeptide chains — two identical heavy chains and two identical light chains.

C. wrong: there are only four chains.

D. wrong: there are only four chains.

Question 149 you win first place you will

_____ you win first place, you will receive a prize.

- A. Whenever
- B. If ✓ **Correct answer**
- C. Unless
- D. So forth

A. wrong: whenever means at any time, not on the condition of winning.

B. correct: if introduces the condition on which the prize depends.

C. wrong: unless means except if, the opposite of the intended condition.

forth is not a conditional conjunction.

Question 150 The train was

The train was _____.

- A. halt
- B. halted ✓ **Correct answer**
- C. had halted
- D. has halted

A. wrong: halt alone is not a passive verb form.

B. correct: was halted is the passive past form required here.

C. wrong: had halted is active past perfect, not passive.

D. wrong: has halted is active present perfect, not passive.

Question 151 Which of the following species has

Which of the following species has the maximum number of unpaired electrons?

- A. O2 ✓ **Correct answer**
- B. O2+
- C. O2-
- D. O22-

A. correct: molecular oxygen has two unpaired electrons (one in each of the two degenerate π* antibonding orbitals), more than any of the ions.

B. wrong: removing one electron leaves one unpaired electron.

C. wrong: adding one electron leaves one unpaired electron.

D. wrong: the peroxide ion has all electrons paired, so it has zero unpaired electrons.

152 A mixture of 10 cm3 of

A mixture of 10 cm3 of oxygen and 50 cm3 of hydrogen is sparked continuously. What is the maximum theoretical decrease in volume?

- A. 10 cm3
- B. 15 cm3
- C. 20 cm3
- D. 30 cm3 ✓ **Correct answer**

A. wrong: the oxygen (10 cm^3) reacts with 20 cm^3 of hydrogen, so the decrease is larger than 10 cm^3.

B. wrong: the decrease is 30 cm^3, not 15.

C. wrong: the decrease counts both gases consumed, 10 + 20 = 30 cm^3.

D. correct: $2H_2 + O_2 \rightarrow 2H_2O$; 10 cm^3 of oxygen consumes 20 cm^3 of hydrogen, and the water formed is liquid, so the gas volume falls by 10 + 20 = 30 cm^3.

Question 153 The oxidation states of nitrogen in

The oxidation states of nitrogen in NH4NO3 are:

- A. –3 and +5 ✓ **Correct answer**
- B. +5 and –3
- C. –3 and –3
- D. zero

A. correct: in NH4NO3 the nitrogen of the ammonium ion ($NH4^+$) is −3 and the nitrogen of the nitrate ion ($NO3^-$) is +5.

B. wrong: this reverses the order — the ammonium nitrogen comes first.

C. wrong: the nitrate nitrogen is +5, not −3.

D. wrong: neither nitrogen is in the zero oxidation state.

154 Which equation relates to the first

Which equation relates to the first ionization energy of bromine?

- A. Br(g) → Br-(g) + e-
- B. Br(g) → Br+(g) + e- ✓ **Correct answer**
- C. ½ Br2(g) → Br-(g) + e-
- D. ½ Br2(g) → Br+(g) + e-

A. wrong: this is electron gain (electron affinity), not ionisation.

B. correct: the first ionisation energy is the energy to remove one electron from a gaseous atom, $Br(g) \rightarrow Br^{+}(g) + e^{-}$.

C. wrong: this starts from half a bromine molecule and forms an anion.

D. wrong: ionisation energy is defined for the gaseous atom, not for half a molecule.

Question 155 Co-ordination number of [Co(en)2Cl2] is

Co-ordination number of [Co(en)2Cl2] is:

- A. –2
- B. 6 ✓ **Correct answer**
- C. 4
- D. None

A. wrong: the coordination number is a count of donor atoms, not a charge.

B. correct: each ethylenediamine (en) is bidentate (2 donor atoms), so 2 en give 4, plus 2 chloride ions gives a coordination number of 6.

C. wrong: 4 counts only the two en ligands and omits the two chlorides.

D. wrong: the coordination number is 6.

156 An olefin X on ozonolysis gives

An olefin “X” on ozonolysis gives CH3CH2COCH3 and CH3COCH3. The IUPAC name of X is:

- A. 2-Butene
- B. 2,3-Dimethyl-2-pentene ✓ **Correct answer**
- C. 2-Pentene
- D. 1-Hexene

A. wrong: ozonolysis of 2-butene gives only ethanal.

B. correct: (CH3)2C=C(CH3)CH2CH3 cleaves to propanone, CH3COCH3, and butan-2-one, CH3COCH2CH3, the two products named.

C. wrong: ozonolysis of 2-pentene gives ethanal and propanal.

D. wrong: ozonolysis of 1-hexene gives methanal and pentanal.

Question 157 Two wires A and B are

Two wires A and B are made of the same material. The wire A has a length L and diameter R while the wire B has a length 2L and diameter R/2. If the two wires are stretched by the same force, the elongation in A divided by the elongation in B is:

- A. 1/8 ✓ **Correct answer**
- B. 1/4
- C. 4
- D. 8

A. correct: elongation $\Delta L = FL/(AY)$ with $A \propto d^2$; for B the length doubles and the area quarters, so $\Delta L_B = 8\Delta L_A$, giving $\Delta L_A/\Delta L_B = 1/8$.

B. wrong: this ignores the area change.

C. wrong: this is the inverse of part of the ratio.

is is the inverse ratio (ΔL_B/ΔL_A).

Question 158 A wire can sustain the weight

A wire can sustain the weight of 20 kg before breaking. If the wire is cut into two equal parts, each part can sustain a weight of:

- A. 10 kg
- B. 20 kg ✓ **Correct answer**
- C. 40 kg
- D. 80 kg

A. wrong: cutting the wire does not halve its breaking strength.

B. correct: the breaking load depends on the cross-sectional area (breaking stress), which is unchanged when the wire is cut, so each half still sustains 20 kg.

C. wrong: cutting does not double the strength.

D. wrong: cutting does not quadruple the strength.

Question 159 Which of the following is not

Which of the following is not an E.M wave?

- A. Radio waves
- B. X-rays
- C. Light waves
- D. Sound waves ✓ **Correct answer**

A. wrong as a non-EM wave: radio waves are electromagnetic.

B. wrong as a non-EM wave: X-rays are electromagnetic.

C. wrong as a non-EM wave: light is electromagnetic.

D. correct: sound is a mechanical wave that needs a medium, not an electromagnetic

Question 160 A shell of mass m moving

A shell of mass m moving with velocity v suddenly breaks into two pieces. The part having mass m/4 remains stationary. The velocity of the other piece will be:

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

A. wrong: momentum must be conserved, and the remaining piece is lighter, so it must move faster than v.

B. wrong: this does not conserve momentum.

C. wrong: this is slower than v, which cannot conserve momentum when a quarter of the mass stops.

D. correct: by conservation of momentum, $mv = 0 + (3m/4)v'$, so $v' = 4v/3$.

Question 161 Platyhelminthes are

Platyhelminthes are:

- A. Bilaterally symmetrical and diploblastic
- B. Bilaterally symmetrical and triploblastic ✓ **Correct answer**
- C. Radially symmetrical and triploblastic
- D. Radially symmetrical and diploblastic

A. wrong: flatworms have three germ layers, not two.

B. correct: Platyhelminthes (flatworms) are bilaterally symmetrical and triploblastic (ectoderm, mesoderm, endoderm).

tworms are bilaterally, not radially, symmetrical.

D. wrong on both counts.

Question 162 The scientific name of freshwater mussel

The scientific name of freshwater mussel is:

- A. Mytilus edulis
- B. Loligo peali
- C. Anodonta grandis ✓ **Correct answer**
- D. Anodonta bairdi

A. wrong: Mytilus edulis is the marine (blue) mussel.

B. wrong: Loligo is a squid.

C. correct: Anodonta grandis is the freshwater mussel.

D. wrong: this is not the scientific name of the freshwater mussel.

Question 163 Potamogeton is an example of

Potamogeton is an example of _____.

- A. Xerophytes
- B. Mesophytes
- C. Hydrophytes ✓ **Correct answer**
- D. Halophytes

A. wrong: xerophytes live in dry places.

B. wrong: mesophytes live in moderately moist land habitats.

C. correct: Potamogeton (pondweed) is an aquatic plant, a hydrophyte.

D. wrong: halophytes live in salty habitats.

164 stimulates fruit ripening

_____ stimulates fruit ripening.

- A. Cytokinins
- B. Abscisic acid
- C. Ethylene ✓ **Correct answer**
- D. Auxin

A. wrong: cytokinins promote cell division, not ripening.

B. wrong: abscisic acid promotes dormancy and leaf fall.

C. correct: ethylene (ethene) is the plant hormone that stimulates fruit ripening.

D. wrong: auxin promotes cell elongation and rooting, not ripening.

Question 165 A condition in which an abnormally

A condition in which an abnormally large volume of urine is produced is:

- A. Polydipsia
- B. Polyuria ✓ **Correct answer**
- C. Polyphagia
- D. Polyanypsida

A. wrong: polydipsia is excessive thirst.

B. correct: polyuria is the production of an abnormally large volume of urine.

C. wrong: polyphagia is excessive eating.

D. wrong: this is not a medical term for urine volume.

Question 166 The bulbourethral glands produce

The bulbourethral glands produce:

- B. Alkaline fluid
- C. Semen
- D. Mucus ✓ **Correct answer**

A. Wrong: the bulbourethral secretion is alkaline, not acidic.

B. Also correct on the facts: the secretion of the bulbourethral (Cowper's) glands is an alkaline fluid.

C. Wrong: semen is the whole ejaculate; the bulbourethral glands contribute only a small part of it.

D. Correct per the printed key: the bulbourethral glands produce a clear mucus that lubricates the urethra. (PICK-ONE: the secretion is an alkaline mucus, so both B (alkaline fluid) and D (mucus) describe it truly; the printed key records D, the substance produced. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 167 HIV destroys a type of defense

HIV destroys a type of defense cell in the body called a _____ helper lymphocyte.

- A. TD4
- B. T4
- C. C4
- D. CD4 ✓ **Correct answer**

A. wrong: there is no TD4 helper lymphocyte.

B. wrong: the cells are named CD4, not T4.

C. wrong: C4 is a complement protein, not a lymphocyte.

D. correct: HIV destroys CD4 helper T-lymphocytes.

168 Acetabularia crenulata has a shaped cap

Acetabularia crenulata has a _____ shaped cap.

- A. irregular ✓ **Correct answer**
- B. umbrella
- C. regular
- D. disc

A. correct: Acetabularia crenulata has an irregular (crenulated) cap, unlike the disc-shaped cap of Acetabularia mediterranea.

B. wrong: umbrella-shaped is a general description of the cap, not the distinguishing form of A. crenulata.

C. wrong: the cap of A. crenulata is irregular.

D. wrong: a disc-shaped cap belongs to Acetabularia mediterranea.

Question 169 He confided me

He confided _____ me.

- A. about
- B. in ✓ **Correct answer**
- C. on
- D. of

A. wrong: confide about is not the idiom.

B. correct: the idiom is to confide in someone.

C. wrong: confide on is not the idiom.

D. wrong: confide of is not the idiom.

170 He said you need not wait

He said, “you need not wait”. Choose the correct indirect speech:

- A. He said that I need not wait ✓ **Correct answer**
- B. He said you needed no wait
- C. He said that wait was not need by you
- D. He said that you must not wait

A. correct: need not does not change in indirect speech, and you becomes I.

B. wrong: this is ungrammatical and keeps the direct pronoun.

C. wrong: this is ungrammatical.

D. wrong: must not changes the meaning (prohibition) and keeps the direct pronoun.

Question 171 Which one is more soluble in

Which one is more soluble in water?

- A. Secondary amines ✓ **Correct answer**
- B. Tertiary amines
- C. Quaternary amines
- D. All are insoluble

A. correct: among the options offered, secondary amines are the most soluble in water — they can donate a hydrogen bond to water, unlike tertiary amines, and quaternary amines are not soluble neutral amines.

B. wrong: tertiary amines cannot donate a hydrogen bond to water, so they are less soluble than secondary amines.

C. wrong: quaternary ammonium compounds are ionic salts, not soluble neutral amines.

D. wrong: the lower amines are soluble in water.

172 The number of peaks given by

The number of peaks given by ethane thiol in NMR spectrum are:

- A. 2
- B. 3 ✓ **Correct answer**
- C. 4
- D. None

A. wrong: ethane thiol has three distinct proton environments.

B. correct: CH3CH2SH gives three NMR signals — the CH3 protons, the CH2 protons and the SH proton.

C. wrong: there are only three proton environments.

D. wrong: three peaks are observed.

Question 173 C4H11N gives the type of isomerism

C4H11N gives the type of isomerism:

- A. Metamerism ✓ **Correct answer**
- B. Optical isomerism
- C. Tautomerism
- D. None

A. Correct per the printed key: C4H11N amines show metamerism — the same molecular formula with different alkyl groups distributed around the nitrogen (for example n-butylamine, diethylamine and methylpropylamine).

B. Also correct on the facts: sec-butylamine, CH3CH(NH2)CH2CH3, has a chiral carbon and is optically active, so C4H11N also shows optical isomerism.

C. Wrong: amines of this formula do not show tautomerism.

D. Wrong: metamerism (and optical isomerism) do occur. (PICK-ONE: both metamerism (A)

isomerism (B) occur for C4H11N; the printed key records A, the classic textbook answer for this formula. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 174 The incorrect statement regarding a gas

The incorrect statement regarding a gas having high value of coefficient of attraction (a) is:

- A. Easy to be liquified
- B. Having higher critical temperature
- C. Less soluble in water ✓ **Correct answer**
- D. None

A. wrong as an incorrect statement: a large attraction constant a does make a gas easy to liquefy.

B. wrong as an incorrect statement: a large a does mean a higher critical temperature.

C. correct as the incorrect statement: a gas with strong intermolecular attraction is more, not less, soluble in water.

D. wrong: statement C is incorrect.

Question 175 Which one can form more acidic

Which one can form more acidic oxide?

- A. Sc
- B. Mn ✓ **Correct answer**
- C. V
- D. Ti

A. wrong: scandium reaches only +3, giving a basic oxide.

B. correct: manganese reaches +7 (as in Mn_2O_7), and the higher the oxidation state the

the oxide, so manganese forms the most acidic oxide of the four.

C. wrong: vanadium reaches +5, less than manganese's +7.

D. wrong: titanium reaches +4, less than manganese's +7.

Question 176 Hydration of a hydrocarbon gives a

Hydration of a hydrocarbon gives a carbonyl compound, the general formula of that hydrocarbon is:

- A. CnH2n+2
- B. CnH2n
- C. CnH2n-2 ✓ **Correct answer**
- D. Both CnH2n and CnH2n-2

A. wrong: alkanes do not undergo hydration to carbonyl compounds.

B. wrong: alkenes hydrate to alcohols, not carbonyl compounds.

C. correct: alkynes (CnH2n−2) undergo hydration to give carbonyl compounds (aldehydes or ketones).

D. wrong: only the alkyne hydrates to a carbonyl compound.

Question 177 Two blocks A and B having

Two blocks “A” and “B” having masses 3 kg and 4 kg are raised to the same height from earth surface. The ratio of gravitational potential of “A” to that of “B” is:

- A. 3 : 4
- B. 4 : 3
- C. 1 : 1 ✓ **Correct answer**
- D. None

A. wrong: 3:4 is the ratio of the gravitational potential energies, not of the gravitational

B. wrong: this is the inverse energy ratio.

C. correct: gravitational potential (per unit mass) depends only on height, not on the mass raised, so both blocks have the same potential at the same height.

D. wrong: the potentials are equal, a ratio of 1:1.

Question 178 Heat and work are equivalent This

Heat and work are equivalent. This means:

- A. When we supply heat to a body we do work on it
- B. When we do work on a body we supply heat to it
- C. The temperature of a body can be increased by doing work on it ✓ **Correct answer**
- D. Heat and work are not inter-convertible

A. wrong: supplying heat does not by itself mean work is done on the body.

B. wrong: work done on a body need not appear as heat supplied to it.

C. correct: heat and work are both forms of energy transfer, and doing work on a body (as in Joule's experiment) can raise its temperature just as heating can.

D. wrong: heat and work are inter-convertible forms of energy.

Question 179 The velocity-time plot for a particle

The velocity-time plot for a particle moving on a straight line is shown in the figure (figure not available in the source paper). Which statement is correct?

- A. The particle has a constant acceleration
- B. The particle has never turned around
- C. The particle has zero displacement

data is insufficient

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

A. Cannot be established: the velocity-time plot the question refers to is not in the source paper, so no statement about the plot can be checked.

B. Cannot be established: without the plot there is no way to tell whether the velocity changed sign.

C. Cannot be established: zero displacement would require the area under the velocity-time plot to be zero, which cannot be checked without the plot; the printed key records C, but it cannot be confirmed from the served source.

D. This describes the served item, but it is not the printed key's answer. (DEFECTIVE-excluded: the stem says the velocity-time plot "is shown in the figure (figure not available in the source paper)" and the PDF contains no images at all (pdfimages -list, 11 Nov 2026), so the question cannot be answered from the served source and the printed key C cannot be verified. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 180 Mark out the correct option

Mark out the correct option:

- A. The energy of any small part of a string remains constant in a travelling wave
- B. The energy of any small part of a string remains constant in a standing wave ✓ **Correct answer**
- C. The energies of all small parts of equal length are equal in a travelling wave
- D. The energies of all small parts of equal length are equal in a standing wave

A. wrong: in a travelling wave, energy flows through each part, so a part's energy varies with time.

B. correct: in a standing wave there is no net transport of energy, and each small part

stant total energy (oscillating between kinetic and potential).

C. wrong: in a travelling wave the energy density varies along the string.

D. wrong: in a standing wave the energy of a part depends on its position (nodes carry none, antinodes the most).

Question 181 The safranin stain is usable for

The safranin stain is usable for:

- A. Fungal hyphae
- B. Cytoplasm/Cellulose
- C. Blood cells
- D. Lignin ✓ **Correct answer**

A. wrong: safranin is not the stain used for fungal hyphae.

B. wrong: safranin does not stain cytoplasm or cellulose.

C. wrong: blood cells are stained by other dyes (for example eosin).

D. correct: safranin stains lignin (lignified walls) red and is the standard stain for lignified tissue.

Question 182 In the human skull the unpaired

In the human skull the unpaired bones are:

- A. Frontal, occipital, ethmoid and sphenoid ✓ **Correct answer**
- B. Frontal, ethmoid, sphenoid and zygomatic
- C. Ethmoid, sphenoid, zygomatic and frontal
- D. Temporal, sphenoid, frontal and ethmoid

A. correct: these four are unpaired bones of the skull (the vomer and mandible are the other unpaired bones, not listed here).

e zygomatic is a paired bone.

C. wrong: the zygomatic is paired.

D. wrong: the temporal bone is paired.

Question 183 Functionally pairs of cranial nerves are

Functionally ____ pairs of cranial nerves are sensory in nature and ____ pairs are mixed in nature and ____ are motor in nature.

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

A. correct: of the 12 pairs of cranial nerves, 3 are sensory (I, II, VIII), 4 are mixed (V, VII, IX, X) and 5 are motor (III, IV, VI, XI, XII).

B. wrong: the counts are in the wrong order.

C. wrong: 5 pairs are motor, not mixed.

D. wrong: only 3 pairs are sensory, not 4.

Question 184 DNA finger printing refers to

DNA finger printing refers to:

- A. Techniques used for identification of finger prints of individuals
- B. Molecular analysis of profiles of DNA samples ✓ **Correct answer**
- C. Analysis of DNA samples using imprinting devices
- D. Both techniques used for identification of finger prints of individuals and analysis of DNA samples using imprinting devices

A. wrong: that is fingerprinting, not DNA fingerprinting.

NA fingerprinting is the molecular analysis of DNA profiles (for example VNTR patterns) to identify individuals.

C. wrong: no imprinting device is involved.

D. wrong: neither part describes DNA fingerprinting.

Question 185 Oleic acid is a fatty acid

Oleic acid is a fatty acid with 18 carbon atoms. It breaks down into 9 acetyl groups. It is estimated that these nine acetyl groups would generate _____ ATP molecules.

- A. 81
- B. 98
- C. 101
- D. 108 ✓ **Correct answer**

A. wrong: 9 acetyl groups × 12 ATP is 108, not 81.

B. wrong: this is not 9 × 12.

C. wrong: this is not 9 × 12.

D. correct: each acetyl group yields 12 ATP through the Krebs cycle (3 NADH = 9, 1 FADH2 = 2, 1 GTP = 1), so 9 acetyl groups yield 9 × 12 = 108 ATP.

Question 186 Horsetails are included in class

Horsetails are included in class:

- A. Pteropsida
- B. Lycopsida
- C. Psilopsida
- D. Sphenopsida ✓ **Correct answer**

A. wrong: Pteropsida are the true ferns.

copsida are the club mosses.

C. wrong: Psilopsida are the whisk ferns.

D. correct: horsetails (Equisetum) belong to the class Sphenopsida.

Question 187 Which one of the following bones

Which one of the following bones is the only movable portion of the skull?

- A. Maxilla
- B. Frontal bone
- C. Mandible ✓ **Correct answer**
- D. Zygomatic

A. wrong: the maxilla (upper jaw) is fixed.

B. wrong: the frontal bone is fixed.

C. correct: the mandible (lower jaw) is the only movable bone of the skull.

D. wrong: the zygomatic (cheek) bone is fixed.

Question 188 Progesterone is secreted by

Progesterone is secreted by:

- A. Corpus luteum ✓ **Correct answer**
- B. Ripening follicles
- C. Uterine epithelium
- D. Fertilized egg

A. correct: progesterone is secreted by the corpus luteum of the ovary.

B. wrong: ripening follicles secrete oestrogen, not progesterone.

C. wrong: the uterine epithelium does not secrete progesterone.

e fertilised egg secretes no progesterone.

Question 189 It is natural for us to

It is natural for us to exert _____ our own success.

- A. in
- B. at ✓ **Correct answer**
- C. against
- D. regarding

A. wrong: exert in is not the idiom used here.

B. correct: as keyed, the preposition used with exert in this construction is at.

C. wrong: exert against means to work against something, which does not fit.

D. wrong: regarding does not follow exert here.

Question 190 Be patient please Choose the passive

Be patient, please! Choose the passive voice:

- A. You are requested to be patient ✓ **Correct answer**
- B. You are ordered to be patient
- C. You are advised to be patient
- D. You are embarrassed to be patient

A. correct: an imperative with please becomes you are requested to in the passive voice.

B. wrong: ordered would suit a command, not a polite please.

C. wrong: advised suits advice, not this polite request.

D. wrong: embarrassed is unrelated to the imperative.

191 Consider reversibility in free radical substitution

Consider reversibility in free radical substitution reaction of alkane, then Kc value is smallest for:

- A. Initiation step ✓ **Correct answer**
- B. Propagation step
- C. Termination step
- D. all same

A. correct: the initiation step (homolytic cleavage to form free radicals) has the smallest equilibrium constant — it is the slow, unfavourable step.

B. wrong: propagation steps have much larger equilibrium constants.

C. wrong: termination (radical combination) is highly favourable, with a large equilibrium constant.

D. wrong: the three steps have very different equilibrium constants.

Question 192 Ethylenediamine diacetate is

Ethylenediamine diacetate is:

- A. Didentate
- B. Tridentate
- C. Tetradentate ✓ **Correct answer**
- D. Hexadentate

A. wrong: ethylenediamine diacetate binds through four donor atoms, not two.

B. wrong: it binds through four donor atoms, not three.

C. correct: ethylenediamine diacetate (en plus two acetate groups) is tetradentate.

D. wrong: the hexadentate ligand is EDTA (ethylenediaminetetraacetate), not the diacetate.

193 Epoxide obtained from isobutylene is further

Epoxide obtained from isobutylene is further hydrolyzed in the presence of acid. The final product is:

- A. 2,3-Butanediol
- B. 1,2-Butanediol
- C. 2-Methyl-1,2-propanediol ✓ **Correct answer**
- D. All of them

A. wrong: acid hydrolysis of the isobutylene epoxide gives a different diol.

B. wrong: this is not the product of isobutylene epoxide hydrolysis.

C. correct: the epoxide of isobutylene (2,2-dimethyloxirane) hydrolyses in acid to 2-methylpropane-1,2-diol.

D. wrong: only the methylpropanediol is formed.

Question 194 In the detection of nitrogen in

In the detection of nitrogen in an organic compound, the appearance of Prussian blue colouration is due to the formation of:

- A. Fe4[Fe(CN)6]3 ✓ **Correct answer**
- B. Na3[Fe(CN)6]
- C. K3[Fe(CN)6]
- D. None

A. correct: the Prussian blue colour in the nitrogen test is due to ferric ferrocyanide, Fe4[Fe(CN)6]3.

B. wrong: sodium ferricyanide is not Prussian blue.

C. wrong: potassium ferricyanide is not Prussian blue.

D. wrong: ferric ferrocyanide is the blue compound.

195 The bond angle in H2S is

The bond angle in H2S is less than H2O. It is due to:

- A. Small size of oxygen atom
- B. Greater E.N of oxygen atom
- C. Oxygen contains two bond pairs of electrons
- D. All of the above ✓ **Correct answer**

A. wrong on its own: the size difference is only part of the explanation.

B. wrong on its own: the electronegativity difference is only part of the explanation.

C. wrong on its own: both H2O and H2S have two bond pairs.

D. correct as keyed: the smaller bond angle in H2S is attributed to the combined effects — the small, highly electronegative oxygen holds its bond pairs closer, increasing repulsion, while the larger, less electronegative sulphur lets the bond pairs spread, giving the smaller angle.

Question 196 The auxochrome not concerned with Metanil

The auxochrome not concerned with Metanil yellow dye is:

- A. –SO3H
- B. –OH ✓ **Correct answer**
- C. –NH2
- D. Both –SO3H and –NH2

A. wrong as the exception: the sulphonic acid group is an auxochrome present in Metanil yellow.

B. correct as the exception: Metanil yellow contains no hydroxyl auxochrome; its auxochromes are –SO3H and –NH2.

C. wrong as the exception: the amino group is an auxochrome present in Metanil yellow.

both of these are present in the dye.

Question 197 A system can be taken from

A system can be taken from the initial state P1V1 to the final state P2V2 by two different methods. Let Q and W represent the heat given to the system and the work done by the system. Which of the following must be the same in both the methods?

- A. Q
- B. W
- C. Q + W
- D. Q – W ✓ **Correct answer**

A. wrong: the heat absorbed depends on the path taken.

B. wrong: the work done depends on the path taken.

C. wrong: with work done by the system, the state function is Q − W, not Q + W.

D. correct: by the first law, ΔU = Q − W, and internal energy is a state function, so Q − W is the same for both methods.

Question 198 At what angle must two forces

At what angle must two forces 2F and √2 F act so that their resultant is F√10?

- A. π/4 ✓ **Correct answer**
- B. π/2
- C. 2π
- D. None of them

A. correct: $R^2 = (2F)^2 + (\sqrt{2}F)^2 + 2(2F)(\sqrt{2}F)\cos\theta = 10F^2$ gives $6 + 4\sqrt{2}\cos\theta = 10$, so $\cos\theta = 1/\sqrt{2}$ and $\theta = 45° = \pi/4$.

B. wrong: at 90° the resultant would be √6 F, not √10 F.

is a full turn, equivalent to 0°, which would give a resultant of (2 + √2)F.

D. wrong: π/4 is the correct angle.

Question 199 When 20 J of work was

When 20 J of work was done on a gas, 40 J of heat energy was released. If the initial internal energy of the gas was 70 J, what is the final internal energy?

- A. 50 J ✓ **Correct answer**
- B. 60 J
- C. 90 J
- D. 110 J

A. correct: by the first law, ΔU = Q + W with work done on the gas (+20 J) and heat released (−40 J), so ΔU = −20 J and U_final = 70 − 20 = 50 J.

B. wrong: this does not follow from ΔU = −20 J.

C. wrong: this would require ΔU = +20 J.

D. wrong: this would require ΔU = +40 J.

Question 200 Time required by the projectile to

Time required by the projectile to reach the summit point is:

- A. T = √(2H/g) ✓ **Correct answer**
- B. T = √(3H/g)
- C. T = √(4H/g)
- D. T = √(H/g)

A. correct: the time to reach the summit is t = u sin θ / g, and with H = $u^2\sin^2\theta/(2g)$ this gives t = √(2H/g).

B. wrong: the factor under the root is 2, not 3.

e factor under the root is 2, not 4.

D. wrong: the factor 2 is missing.

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