MDCAT (ETEA entry test, Paper MDCAT-1) — 2015 · Solved Past Paper

Body: Educational Testing and Evaluation Agency (ETEA) · **Post:** MDCAT (ETEA entry test, Paper MDCAT-1) · **Year:** 2015 · **Questions:** 200 in the original paper — **200 solved and verified**, none excluded · **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 2015 sitting.

Source note: Question stems and options: ETEA MDCAT 2015, Paper MDCAT-1 (educationinkarachi.net/wp-content/uploads/2026/09/ETEA-MDCAT-2015.pdf; Q1-200 contiguous, 4 options each; complete answer-key table at the end, Q1-200, with the key note that where two letters are shown both options are correct). Exam held Wednesday 12 August 2015 (originally scheduled Sunday 9 Aug 2015, postponed by rain to Wednesday 12 Aug 2015 — Frontier Post, 2 Aug 2015; KMU announcement and result announced 13 Aug 2015). Printed key letter counts A40 / B63 / C48 / D48 (single-letter entries) plus 1 dual-letter entry (Q152 A/D). Subjects Biology/Chemistry/Physics/English interleaved across Q1-Q200 (no subject sections in the printed paper). 1 PICK-ONE (Q152) and 0 DEFECTIVE-excluded. Q36 structure and Q174 option structures recovered from the source PDF's own embedded images. Answers verified independently against reference facts, worked derivations and targeted sources, never from the printed key alone. A second reproduction's 2015 key (Abbasi compilation, Scribd) differs in 15/200 places; each was adjudicated by textbook evidence and the printed key stands in every case. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

1 All of the following are co-enzymes

All of the following are co-enzymes except:

- A. NAD
- B. FAD
- C. NADP
- D. ADP ✓ **Correct answer**

A. wrong as the exception: NAD is a co-enzyme.

B. wrong as the exception: FAD is a co-enzyme.

C. wrong as the exception: NADP is a co-enzyme.

D. correct as the exception: ADP is not a co-enzyme (it is an energy-carrying nucleotide, not a co-enzyme).

Question 2 Carotenoids pigments are

Carotenoids pigments are:

- A. Yellow, Red, Green, Blue
- B. Orange, Yellow, Red, Brown ✓ **Correct answer**
- C. Green, Yellow, Blue, Brown
- D. Blue, Red, Green, Yellow

A. wrong: carotenoids are not green or blue.

B. correct: carotenoid pigments are orange, yellow, red and brown.

C. wrong: carotenoids are not green or blue.

D. wrong: carotenoids are not blue or green.

3 Polio immunization vaccine is effective

Polio immunization vaccine is effective:

- A. 50%
- B. 60%
- C. 80%
- D. 90% ✓ **Correct answer**

A. wrong: the polio vaccine is more than 50% effective.

B. wrong: the textbook value is 90%.

C. wrong: the textbook value is 90%.

D. correct: the polio immunisation vaccine is about 90% effective.

Question 4 NH4OHaq NH4aq OH-aq Consider the above

NH4OH(aq) ↔️ NH4+(aq) + OH-(aq) Consider the above ionization, Ammonium chloride is added to the system. Select the correct statement.

- A. The equilibrium will shift to the right
- B. The equilibrium will shift to the left ✓ **Correct answer**
- C. The equilibrium will remain undisturbed
- D. The equilibrium will be attained quickly

A. wrong: adding NH_4^+ (a product) shifts the equilibrium to the left.

B. correct: adding ammonium chloride increases the NH_4^+ concentration, so by the common-ion effect and Le Chatelier's principle the ionisation equilibrium shifts to the left.

C. wrong: the added common ion disturbs the equilibrium.

D. wrong: the equilibrium shifts, it is not merely attained more quickly.

5 Select molecule that has unpaired electrons

Select molecule that has unpaired electrons in anti-bonding molecular orbitals:

- A. N2
- B. Cl2
- C. H2
- D. O2 ✓ **Correct answer**

A. wrong: N2 has no unpaired electrons in antibonding orbitals.

B. wrong: Cl2 has no unpaired electrons in antibonding orbitals.

C. wrong: H2 has no unpaired electrons in antibonding orbitals.

D. correct: molecular oxygen has two unpaired electrons in its antibonding π* orbitals.

Question 6 Waxes are the esters of fatty

Waxes are the esters of fatty acids with high molecular weight.

- A. Monohydroxy alcohols ✓ **Correct answer**
- B. Dihydroxy alcohol
- C. Trihydroxy alcohol
- D. All of the above

A. correct: waxes are esters of long-chain fatty acids with monohydroxy alcohols of high molecular weight.

B. wrong: waxes are not esters of dihydroxy alcohols.

C. wrong: esters of fatty acids with trihydroxy alcohol (glycerol) are fats and oils, not waxes.

D. wrong: only monohydroxy alcohols form waxes.

7 The percentage error in the measurement

The percentage error in the measurement of mass and speed are 5% or 6% respectively the maximum error in the measurement of K.E is:

- A. 17% ✓ **Correct answer**
- B. 30%
- C. 15%
- D. 90%

A. correct: kinetic energy is $\frac{1}{2}mv^2$, so the maximum percentage error is the error in m plus twice the error in v: 5% + 2 × 6% = 17%.

B. wrong: this does not follow from the error formula.

C. wrong: this does not follow from the error formula.

D. wrong: this does not follow from the error formula.

Question 8 Weight rather than mass is used

Weight rather than mass is used in calculating:

- A. moment of inertia of a body
- B. the stress in a wire due to load hanging from it ✓ **Correct answer**
- C. the binding energy of the nucleus
- D. the gravitational force between the two bodies

A. wrong: the moment of inertia depends on mass, not weight.

B. correct: the stress is caused by the weight (force) of the hanging load, so weight is used.

C. wrong: binding energy is calculated from mass defect, not weight.

D. wrong: the gravitational force uses the masses of the bodies.

9 Two vectors A and B are

Two vectors A and B are such that A + B = A – B then select the correct statement:

- A. A = 0
- B. B = 0 ✓ **Correct answer**
- C. neither A nor B is zero
- D. None of the above

A. wrong: A + B = A − B gives B = 0, not A = 0.

B. correct: A + B = A − B implies 2B = 0, so B is the zero vector.

C. wrong: B must be zero.

D. wrong: B = 0 is the correct statement. (Noted: a second reproduction's key records D, but B = 0 follows directly from the vector equation, so the printed key B stands.)

Question 10 He extolled the virtues of the

He extolled the virtues of the Russian people. [The underlined word means:]

- A. Admired
- B. Praised ✓ **Correct answer**
- C. Censured
- D. Adopted

A. wrong: extolled means praised, not merely admired.

B. correct: to extol is to praise enthusiastically.

C. wrong: censured means criticised, the opposite of extolled.

D. wrong: adopted means taken up, not praised.

11 Balantidium coli lives in the intestinal

Balantidium coli lives in the intestinal tract of:

- A. Pigs and rats
- B. Pigs and monkeys ✓ **Correct answer**
- C. Rats and dogs
- D. Cats and sheep

A. wrong: Balantidium coli is not recorded from rats.

B. correct: Balantidium coli lives in the large intestine of pigs and monkeys (and man).

C. wrong: Balantidium coli is not recorded from rats or dogs.

D. wrong: Balantidium coli is not recorded from cats or sheep. (Noted: a second reproduction's key records A, but the textbook host range is pigs and monkeys, so the printed key B stands.)

Question 12 Excited electrons from photo system-II are

Excited electrons from photo system-II are captured by:

- A. PC
- B. PQ ✓ **Correct answer**
- C. Cytochrome-b
- D. —

A. wrong: plastocyanin accepts electrons later in the chain, not directly from photosystem II.

B. correct: excited electrons from photosystem II are captured by plastoquinone (PQ), the primary electron acceptor.

C. wrong: cytochrome-b is part of the cytochrome b6f complex, downstream of PQ.

D. wrong: this option is a dash as printed, not an acceptor.

13 Dicotyledonous flowers are usually

Dicotyledonous flowers are usually:

- A. Dimerous
- B. Trimerous
- C. Tetramerous
- D. Pentamerous ✓ **Correct answer**

A. wrong: dimerous (two-part) flowers are not typical of dicots.

B. wrong: trimerous (three-part) flowers are typical of monocots.

C. wrong: tetramerous (four-part) flowers are not the usual dicot pattern.

D. correct: dicotyledonous flowers are usually pentamerous (in fives).

Question 14 Select mineral that is considered a

Select mineral that is considered a macronutrient.

- A. Phosphorus ✓ **Correct answer**
- B. Zinc
- C. Iron
- D. Iodine

A. correct: phosphorus is a macronutrient, needed by plants in large amounts.

B. wrong: zinc is a micronutrient.

C. wrong: iron is a micronutrient.

D. wrong: iodine is a micronutrient.

15 Two atoms A and B have

Two atoms A and B have the electronic configuration given below: (x) 1S22S22P63S1 (y) 1S2 2S22P5 Which of the following compounds are they likely to form?

- A. Xy ✓ **Correct answer**
- B. Xy2
- C. X2y
- D. Xy3

A. correct: X ($1s^2 2s^2 2p^6 3s^1$) is sodium, which forms X^+, and Y ($1s^2 2s^2 2p^5$) is fluorine, which forms Y^-, so they form the compound XY (sodium fluoride).

B. wrong: sodium forms a +1 ion, so it cannot form XY2.

C. wrong: fluorine forms a −1 ion, so two X atoms are not needed.

D. wrong: neither ion has a charge of 3.

Question 16 Which of the following ions can

Which of the following ions can act both as bronsted acid and base in solvent water?

- A. CN-
- B. SO42-
- C. HCO3- ✓ **Correct answer**
- D. PO43-

A. wrong: the cyanide ion acts only as a base in water.

B. wrong: the sulphate ion acts only as a base in water.

C. correct: the hydrogencarbonate ion is amphiprotic — it can donate a proton (acting as an acid) or accept one (acting as a base).

D. wrong: the phosphate ion acts only as a base in water.

17 Which of the following is the

Which of the following is the best evidence for the wave nature of matter?

- A. The photoelectric effect
- B. The Compton effect
- C. The spectral radiation from cavity radiation
- D. The reflection of electrons by crystal ✓ **Correct answer**

A. wrong: the photoelectric effect is evidence for the particle nature of light.

B. wrong: the Compton effect is evidence for the particle nature of light.

C. wrong: cavity radiation is evidence for the particle (quantum) nature of light.

D. correct: the diffraction (reflection) of electrons by a crystal shows that electrons behave as waves — the best evidence for the wave nature of matter.

Question 18 If P is the momentum of

If P is the momentum of an object of mass m, then expression P2/m has the same unit as:

- A. Acceleration
- B. Energy ✓ **Correct answer**
- C. Force
- D. Impulse

A. wrong: P^2/m has the units of energy, not acceleration.

B. correct: P^2/m has the units of $(kg \cdot m/s)^2/kg = kg \cdot m^2/s^2$ = joules, the unit of energy (kinetic energy is $P^2/2m$).

C. wrong: P^2/m has the units of energy, not force.

D. wrong: P^2/m has the units of energy, not impulse.

19 Conservation of linear momentum is equivalent

Conservation of linear momentum is equivalent to:

- A. Newton’s 1st law of motion
- B. Newton’s 2nd law of motion
- C. Newton’s 3rd law of motion ✓ **Correct answer**
- D. None of the above

A. wrong: the first law is the law of inertia, not the conservation of momentum.

B. wrong as the answer here: the textbook derives the conservation of linear momentum from the third law.

C. correct: the conservation of linear momentum follows from Newton's third law (action and reaction are equal and opposite), so the two are equivalent.

D. wrong: the conservation of momentum is equivalent to Newton's third law. (Noted: a second reproduction's key records B, but the textbook derivation is from the third law, so the printed key C stands.)

Question 20 He was in bed all day

He was _____ in bed all day yesterday.

- A. Laying
- B. Lying ✓ **Correct answer**
- C. Lieing
- D. Lied

A. wrong: "laying" means putting something down.

B. correct: "He was lying in bed all day yesterday" — lying is the present participle of lie (to recline).

C. wrong: this is a misspelling.

ed" is the past of lie (to tell an untruth).

Question 21 All of the following are triploblastic

All of the following are triploblastic animals except:

- A. Annelida
- B. Mollusca
- C. Coelenterata ✓ **Correct answer**
- D. Echinodermata

A. wrong as the exception: annelids are triploblastic.

B. wrong as the exception: molluscs are triploblastic.

C. correct as the exception: coelenterates (Cnidaria) are diploblastic, not triploblastic.

D. wrong as the exception: echinoderms are triploblastic.

Question 22 Hermaphrodite phylum is

Hermaphrodite phylum is:

- A. Annelida ✓ **Correct answer**
- B. Arthropoda
- C. Echinodermata
- D. Mollusca

A. correct: annelids (for example the earthworm) are hermaphrodite — each individual has both male and female reproductive organs.

B. wrong: arthropods are generally dioecious (separate sexes).

C. wrong: echinoderms are generally dioecious.

D. wrong as the answer here: although some molluscs are hermaphrodite, the textbook answer for this question is Annelida.

23 A hormone that helps in growing

A hormone that helps in growing seedless grapes,

- A. Auxins
- B. Cytokinins
- C. Ethylene
- D. Gibberellins ✓ **Correct answer**

A. wrong: auxins promote cell elongation and rooting, not seedless grapes.

B. wrong: cytokinins promote cell division, not seedless grapes.

C. wrong: ethylene promotes fruit ripening, not seedless grapes.

D. correct: gibberellins are used to grow seedless grapes (they promote fruit growth without fertilisation).

Question 24 Oligosaccharides class of carbohydrates contain monosacchari

Oligosaccharides class of carbohydrates contain monosaccharides of about:

- A. 2 to 8 units
- B. 2 to 9 units
- C. 2 to 10 units ✓ **Correct answer**
- D. 2 to 11 units

A. wrong: the textbook range is 2 to 10 monosaccharide units.

B. wrong: the textbook range is 2 to 10 monosaccharide units.

C. correct: oligosaccharides contain 2 to 10 monosaccharide units.

D. wrong: the textbook range is 2 to 10 monosaccharide units.

25 Molar extinction coefficient a constant in

Molar extinction coefficient (ε) a constant in Beer-Lambert law is the characteristics of the:

- A. Solute ✓ **Correct answer**
- B. Solvent
- C. concentration
- D. All of the above

A. correct: the molar extinction coefficient (ε) in the Beer-Lambert law is characteristic of the solute (the absorbing substance).

B. wrong: ε is a property of the solute, not the solvent.

C. wrong: ε is independent of concentration.

D. wrong: ε is characteristic of the solute only.

Question 26 The energy difference between adjacent energy

The energy difference between adjacent energy levels of the hydrogen atom:

- A. Increases with increasing energy
- B. Decreases with increasing energy ✓ **Correct answer**
- C. First increases and then decreases with increasing energy
- D. First decreases and then increases with increasing energy

A. wrong: the energy levels get closer together as n increases.

B. correct: in hydrogen, $E_n = -13.6/n^2$ eV, so the gap between adjacent levels $E_{(n+1)} - E_n$ gets smaller as n (and the energy) increases.

C. wrong: the gap decreases monotonically.

D. wrong: the gap decreases monotonically.

27 A parachute of mass 80 kg

A parachute of mass 80 kg descends vertically at a constant velocity of 3.0 m s-1 taking acceleration of free fall as 10 m s-2, what is the net force acting on him?

- A. 800 N upwards
- B. Zero ✓ **Correct answer**
- C. 240 N downwards
- D. 360 N downwards

A. wrong: 800 N is the weight, not the net force.

B. correct: the parachute descends at constant velocity, so the acceleration is zero and the net force is zero (air resistance balances the weight).

C. wrong: the net force is zero.

D. wrong: the net force is zero.

Question 28 Two projectiles are in flight at

Two projectiles are in flight at the same time. The acceleration of one relative to other:

- A. always 9.8 m s-2
- B. can be horizontal
- C. can be as large as 19.8 m s-2
- D. is zero ✓ **Correct answer**

A. wrong: the relative acceleration is zero, not 9.8 m/s^2.

B. wrong: both projectiles accelerate vertically downward, so their relative acceleration cannot be horizontal.

C. wrong: the relative acceleration is zero.

D. correct: both projectiles have the same acceleration (g downward), so the acceleration of one relative to the other is zero.

29 A body is moving in a

A body is moving in a circle of radius (r) with a variable speed, the acceleration of the body is:

- A. centripetal acceleration
- B. tangential acceleration
- C. angular acceleration
- D. All of the above ✓ **Correct answer**

A. wrong on its own: a body moving in a circle with variable speed also has tangential and angular acceleration.

B. wrong on its own: the body also has centripetal and angular acceleration.

C. wrong on its own: the body also has centripetal and tangential acceleration.

D. correct: with variable speed in a circle, the body has centripetal acceleration (changing direction), tangential acceleration (changing speed) and angular acceleration.

Question 30 He said to me Why have

He said to me, “Why have you come late?” [Indirect form of the sentence is:]

- A. He asked me why I had come late ✓ **Correct answer**
- B. He asked me why I came late.
- C. He asked me why I have come late.
- D. He told me as to why I had come late.

A. correct: the direct question "Why have you come late?" becomes "why I had come late" in the indirect form (present perfect → past perfect).

B. wrong: the tense should shift to the past perfect.

C. wrong: the tense must shift back in indirect speech.

D. wrong: "told me as to why" is not the correct indirect form of a question.

31 The product of light reaction travel

The product of light reaction travel from:

- A. Cristae to stroma
- B. Stroma to grana
- C. Grana to cristae
- D. Grana to stroma ✓ **Correct answer**

A. wrong: cristae are in mitochondria, not chloroplasts.

B. wrong: the products travel from the grana to the stroma, not the reverse.

C. wrong: cristae are in mitochondria.

D. correct: the products of the light reactions (ATP and NADPH) are made in the grana (thylakoids) and travel to the stroma, where the dark reactions use them.

Question 32 In stomach the pepsinogen is synthesized

In stomach the pepsinogen is synthesized and secreted by:

- A. Mucus cells
- B. Parietal cells
- C. Hormonal cells
- D. Chief cells ✓ **Correct answer**

A. wrong: mucus cells secrete mucus, not pepsinogen.

B. wrong: parietal cells secrete hydrochloric acid.

C. wrong: hormonal (G) cells secrete gastrin.

D. correct: pepsinogen is synthesised and secreted by the chief (zymogen) cells of the stomach.

33 Amount of O2 carried by red

Amount of O2 carried by red blood cells is:

- A. 77%
- B. 90%
- C. 87%
- D. 97% ✓ **Correct answer**

A. wrong: the textbook value is 97%.

B. wrong: the textbook value is 97%.

C. wrong: the textbook value is 97%.

D. correct: about 97% of the oxygen in blood is carried by the red blood cells (bound to haemoglobin).

Question 34 Choose the correct relationship when E

Choose the correct relationship, when E = energy, h = Planck's constant, c = velocity of light, ν = frequency, λ = wave length:

- A. E = hνc
- B. E = c / λ
- C. E = hν ✓ **Correct answer**
- D. E = nλ / c

A. wrong: E = hν, not hνc.

B. wrong: c/λ is the frequency, not the energy.

C. correct: the energy of a photon is E = hν (Planck's relation).

D. wrong: this is not the energy relation.

35 Choose reactants whose reaction product is

Choose reactants whose reaction product is ester:

- A. CH3COOH and CH3OCH3
- B. CH3COOH and C2H5OH ✓ **Correct answer**
- C. CH3COOH and CH3CHO
- D. CH3COOH and CH3COCH3

A. wrong: an acid and an ether do not give an ester.

B. correct: ethanoic acid reacts with ethanol (an alcohol) to give the ester ethyl ethanoate.

C. wrong: an acid and an aldehyde do not give an ester.

D. wrong: an acid and a ketone do not give an ester.

Question 36 Choose the IUPAC name of the

Choose the IUPAC name of the following compound: CH3–CH(CH3)–CH2–CH=CH2

- A. 4-Methyl-1-Pentene ✓ **Correct answer**
- B. 2-Methyl-3-Pentene
- C. 2-Methyl-2-Pentene
- D. 4,4-Dimethyl-2-Pentene

A. correct: the structure CH3–CH(CH3)–CH2–CH=CH2 has a five-carbon chain with the double bond at C-1 and a methyl group at C-4, so it is 4-methylpent-1-ene.

B. wrong: the double bond is at C-1, not C-3.

C. wrong: the double bond is at C-1, not C-2.

D. wrong: there is only one methyl branch, not two. (Noted: the structure is printed as a diagram in the source PDF and is transcribed here as CH3–CH(CH3)–CH2–CH=CH2.)

37 A particle of mass m has

A particle of mass m has momentum P, its K.E will be:

- A. mP
- B. P2m
- C. P2/m
- D. P2/2m ✓ **Correct answer**

A. wrong: the kinetic energy is $P^2/2m$.

B. wrong: the kinetic energy is $P^2/2m$.

C. wrong: the factor of 2 is missing.

D. correct: kinetic energy is $\frac{1}{2}mv^2$, and with $P = mv$ this becomes $P^2/2m$.

Question 38 The rotational analogue of mass in

The rotational analogue of mass in linear motion is:

- A. Torque
- B. Weight
- C. Moment of inertia ✓ **Correct answer**
- D. Angular momentum

A. wrong: torque is the rotational analogue of force.

B. wrong: weight is a force, not the analogue of mass.

C. correct: the moment of inertia is the rotational analogue of mass.

D. wrong: angular momentum is the rotational analogue of linear momentum.

Question 39 The ratio of inertial mass to

The ratio of inertial mass to the gravitational mass is equal to:

- B. 1 ✓ **Correct answer**
- C. 2
- D. No fixed number

A. wrong: the two masses are equal.

B. correct: the inertial mass and the gravitational mass of a body are equal, so their ratio is 1 (the principle of equivalence).

C. wrong: the ratio is 1.

D. wrong: the ratio is fixed at 1.

Question 40 Choose the Correct sentence

Choose the Correct sentence:

- A. He throwed it out the window.
- B. He threw it out the window. ✓ **Correct answer**
- C. He thrown out it the window.
- D. He thrown it out the window.

A. wrong: "throwed" is not the past tense of throw.

B. correct: "threw" is the past tense of throw.

C. wrong: the word order and verb form are wrong.

D. wrong: "thrown" needs an auxiliary (has thrown).

Question 41 6-NADH can yield

6-NADH can yield:

- A. 12-ATP
- B. 38-ATP

- ATP ✓ Correct answer
- D. 36-ATP

A. wrong: 6 NADH give 18 ATP, not 12.

B. wrong: 38 ATP is the total yield of one glucose molecule, not of 6 NADH.

C. correct: each NADH yields 3 ATP in the electron transport chain, so 6 NADH yield 18 ATP.

D. wrong: 6 NADH give 18 ATP, not 36.

Question 42 Rhizobium belong to sub group of

Rhizobium belong to sub group of bacteria called:

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

A. correct: Rhizobium belongs to the alpha-proteobacteria.

B. wrong: Rhizobium is not a beta-proteobacterium.

C. wrong: Rhizobium is not a gamma-proteobacterium.

D. wrong: Rhizobium is not a delta-proteobacterium.

Question 43 Bacteria living in the gut forms

Bacteria living in the gut, forms the association of:

- A. Mutualism ✓ **Correct answer**
- B. Predation
- C. Parasitism
- D. Commensalism

bacteria living in the gut (for example E. coli) form a mutualistic association — the bacteria get food and shelter while the host gets vitamins (such as vitamin K) synthesised by the bacteria.

B. wrong: predation is one organism eating another.

C. wrong: gut bacteria are not parasites — both partners benefit.

D. wrong: in commensalism only one partner benefits, but here both partners benefit, so it is mutualism. (Noted: a second reproduction's key records D, but the textbook association for gut flora is mutualism, so the printed key A stands.)

Question 44 Which is the strongest acid

Which is the strongest acid?

- A. CH3COOH
- B. CH2ClCOOH
- C. CHCl2COOH
- D. CCl3COOH ✓ **Correct answer**

A. wrong: acetic acid is the weakest of the four.

B. wrong: monochloroacetic acid is weaker than the di- and trichloro acids.

C. wrong: dichloroacetic acid is weaker than trichloroacetic acid.

D. correct: trichloroacetic acid is the strongest — the three electron-withdrawing chlorine atoms stabilise the conjugate base most.

Question 45 Choose the type of hybridization of

Choose the type of hybridization of carbon atoms in cyclopropane and the bond angle C–C–C.

- A. Sp3, 109.5°

, 60° ✓ Correct answer

- C. Sp2, 120°
- D. Sp2, 107°

A. wrong: the hybridisation is sp3 but the bond angle in cyclopropane is 60°, not 109.5°.

B. correct: the carbons of cyclopropane are sp3 hybridised, and the C–C–C bond angle is 60° (the angle of the three-membered ring).

C. wrong: cyclopropane carbons are sp3, not sp2.

D. wrong: cyclopropane carbons are sp3, not sp2.

Question 46 Hemiacetal containing both

Hemiacetal containing both:

- A. Alcohol and aldehyde functional groups
- B. Alcohol and ether functional groups ✓ **Correct answer**
- C. Aldehyde and ether functional groups
- D. Alcohol and carboxylic acid functional groups

A. wrong: a hemiacetal contains an alcohol and an ether group.

B. correct: a hemiacetal (R–CH(OH)–OR′) contains both a hydroxyl (alcohol) group and an alkoxy (ether) group on the same carbon.

C. wrong: a hemiacetal has no aldehyde group.

D. wrong: a hemiacetal has no carboxylic acid group.

Question 47 A satellite is orbiting close to

A satellite is orbiting close to the surface of the earth, its speed is:

- A. √(2gR)
- B. √(Rg) ✓ **Correct answer**

- D. Rg

A. wrong: √(2gR) is the escape velocity, not the orbital velocity.

B. correct: the orbital velocity of a satellite close to the Earth's surface is v = √(gR).

C. wrong: this has the wrong units and value.

D. wrong: this has the wrong units and value.

Question 48 In an adiabatic process there is

In an adiabatic process there is no:

- A. Work done
- B. Exchange of heat ✓ **Correct answer**
- C. Change in temperature
- D. Change in internal energy

A. wrong: work can be done in an adiabatic process.

B. correct: in an adiabatic process there is no exchange of heat with the surroundings (Q = 0).

C. wrong: the temperature can change in an adiabatic process.

D. wrong: the internal energy can change in an adiabatic process.

Question 49 The ratio between the velocity of

The ratio between the velocity of sound in air at 4 atm and that at 3 atm pressure would be:

- A. 1 : 1 ✓ **Correct answer**
- B. 4 : 1
- C. 1 : 4

A. correct: at constant temperature the velocity of sound in a gas is independent of pressure, so the ratio is 1:1.

B. wrong: the velocity does not increase with pressure.

C. wrong: the velocity does not decrease with pressure.

D. wrong: the velocity is independent of pressure.

Question 50 His bad friends will ruin him

His bad friends will ruin him. [Passive form of the sentence is:]

- A. He will be ruin by his bad friends.
- B. He is ruined by his bad friends.
- C. He will be ruined by his bad friends. ✓ **Correct answer**
- D. He is being ruined by his bad friends.

A. wrong: "be ruin" is ungrammatical.

B. wrong: the tense is present, but the active sentence is in the future.

C. correct: the active future "will ruin" becomes the passive future "will be ruined".

D. wrong: the continuous present changes the tense.

Question 51 Foraminifers helps to determine the

“Foraminifers” helps to determine the,

- A. Generation time
- B. Geological age ✓ **Correct answer**
- C. Ecological time
- D. Physiological age

raminifers do not determine generation time.

B. correct: foraminifers (forams) are index fossils used to determine the geological age of rocks.

C. wrong: foraminifers do not determine ecological time.

D. wrong: foraminifers do not determine physiological age.

Question 52 Phytochrome Pr absorbs red light of

Phytochrome “Pr” absorbs red light of wavelength.

- A. 600 nm
- B. 660 nm ✓ **Correct answer**
- C. 560 nm
- D. 730 nm

A. wrong: Pr absorbs at 660 nm, not 600 nm.

B. correct: phytochrome Pr absorbs red light of wavelength 660 nm (Pfr absorbs far-red at 730 nm).

C. wrong: Pr absorbs at 660 nm, not 560 nm.

D. wrong: 730 nm is absorbed by Pfr, not Pr.

Question 53 Basidiomycota is also called as

Basidiomycota is also called as:

- A. Club-mosses
- B. Club-fungi ✓ **Correct answer**
- C. Sac-fungi
- D. Bread mold

A. wrong: club-mosses are Lycopodium (plants), not fungi.

Basidiomycota are called club-fungi because they produce spores on club-shaped basidia.

C. wrong: sac-fungi are the Ascomycota.

D. wrong: bread mold (Rhizopus) is a zygomycete.

Question 54 Choose group that cause solubility of

Choose group that cause solubility of the dye in acids.

- A. –OH
- B. –NH2 ✓ **Correct answer**
- C. –SO3H
- D. –COOH

A. wrong: the hydroxyl group does not make a dye soluble in acids.

B. correct: the amino group (–NH2) is basic, so it is protonated in acids and makes the dye soluble in acids.

C. wrong: the sulphonic acid group makes a dye soluble in water, not specifically in acids.

D. wrong: the carboxyl group makes a dye soluble in alkalis, not in acids.

Question 55 What is the number of hydrogen

What is the number of hydrogen atoms in 5 moles of water?

- A. 3.0115 × 10^24
- B. 6.023 × 10^24 ✓ **Correct answer**
- C. 6.023 × 10^23
- D. 5.0 × 10^23

A. wrong: this is the number of hydrogen atoms in 2.5 moles of water.

B. correct: 5 moles of water contain 5 × 2 = 10 moles of hydrogen atoms, which is 10 ×

= 6.023 × 10²³ atoms.

C. wrong: this is the number of hydrogen atoms in 0.5 moles of water.

D. wrong: this does not follow from the given amount.

Question 56 In the main postulates of Bohr

In the main postulates of Bohr atomic theory the angular momentum of electron in hydrogen atom is given by the relationship.

- A. mv = λ / 2π
- B. r = Ze2 / (4πε0mv)
- C. mvr = nh / 2π ✓ **Correct answer**
- D. hνc

A. wrong: this is not Bohr's angular momentum relation.

B. wrong: this is not Bohr's angular momentum relation.

C. correct: Bohr's postulate is that the angular momentum of the electron is quantised, mvr = nh/2π.

D. wrong: this is not Bohr's angular momentum relation.

Question 57 Colors of thin film result from

Colors of thin film result from

- A. Dispersion
- B. Interference of light ✓ **Correct answer**
- C. Absorption of light
- D. Scattering of light

A. wrong: thin-film colours are not caused by dispersion.

B. correct: the colours of a thin film result from the interference of light reflected from its

C. wrong: thin-film colours are not caused by absorption.

D. wrong: thin-film colours are not caused by scattering.

Question 58 During a reversible adiabatic expansion of

During a reversible adiabatic expansion of an Ideal gas, which of the following is not true?

- A. PVγ = constant
- B. PV = constant ✓ **Correct answer**
- C. PV = nRT
- D. TVγ-1 = constant

A. wrong as the not-true statement: PV^γ = constant is true for a reversible adiabatic process.

B. correct as the not-true statement: PV = constant holds for an isothermal process, not for an adiabatic process.

C. wrong as the not-true statement: the ideal gas equation holds in any process.

D. wrong as the not-true statement: TV^(γ−1) = constant is true for a reversible adiabatic process.

Question 59 The energy absorbed as heat by

The energy absorbed as heat by an ideal gas for an isothermal process is equal to:

- A. The work done by the gas ✓ **Correct answer**
- B. The work done on the gas.
- C. Change in the internal energy of the gas
- D. Zero, since the process is isothermal

an isothermal process the internal energy does not change (ΔU = 0), so by the first law the heat absorbed equals the work done by the gas.

B. wrong: the heat absorbed equals the work done BY the gas.

C. wrong: the internal energy does not change in an isothermal process.

D. wrong: heat is absorbed and work is done; only the internal energy change is zero.

Question 60 It has been raining continuously last

It has been raining continuously _____ last night.

- A. since ✓ **Correct answer**
- B. for
- C. from
- D. with

A. correct: "It has been raining continuously since last night" — since is used with a point of time in the past.

B. wrong: "for" is used with a period of time, not a point of time.

C. wrong: "from" is not used with the present perfect continuous here.

D. wrong: "with" does not fit here.

Question 61 Termites cut wood with the help

Termites cut wood with the help of enzyme produced by:

- A. Trichonella
- B. Tripanosoma
- C. Trichonympha ✓ **Correct answer**
- D. Trichina

A. wrong: this is not the organism in the termite gut.

ypanosoma is a blood parasite, not the termite gut symbiont.

C. correct: termites cut wood with the help of the enzyme (cellulase) produced by the protozoan Trichonympha living in their gut.

D. wrong: Trichina (Trichinella) is a parasitic roundworm.

Question 62 CSF is found in between

CSF is found in between:

- A. Pia mater and dura mater
- B. Pia mater and arachnoid mater ✓ **Correct answer**
- C. Grey mater and pia mater
- D. Dura mater and grey mater

A. wrong: the cerebrospinal fluid is not between the pia and dura mater.

B. correct: the cerebrospinal fluid is found in the subarachnoid space, between the pia mater and the arachnoid mater.

C. wrong: the cerebrospinal fluid is not between the grey matter and the pia mater.

D. wrong: the cerebrospinal fluid is not between the dura mater and the grey matter.

Question 63 Vernalization is the conversion of

Vernalization is the conversion of:

- A. Spring variety to the winter variety
- B. Winter variety to the spring variety ✓ **Correct answer**
- C. Winter variety to the summer variety
- D. Summer variety to the winter variety

A. wrong: vernalisation converts the winter variety to the spring variety.

B. correct: vernalisation is the cold treatment that converts a winter variety (needing cold

to a spring variety.

C. wrong: vernalisation does not produce a summer variety.

D. wrong: vernalisation does not convert summer to winter varieties.

Question 64 Which region of electromagnetic spectrum is

Which region of electromagnetic spectrum is involved in nuclear magnetic resonance (NMR spectroscopy)?

- A. Micro wave
- B. Radio wave ✓ **Correct answer**
- C. Infrared region
- D. X-rays

A. wrong: NMR uses radio waves, not microwaves.

B. correct: nuclear magnetic resonance involves radio-frequency radiation.

C. wrong: infrared is used in IR spectroscopy, not NMR.

D. wrong: X-rays are used in X-ray diffraction, not NMR.

Question 65 The reduction of aldehydes and ketones

The reduction of aldehydes and ketones in the presence of zinc amalgam and HCl is termed as:

- A. Grignard reduction
- B. Clemmensen reduction ✓ **Correct answer**
- C. Wolff-Kishner reduction
- D. Friedel-Crafts reduction

A. wrong: the Grignard reagent is not used for this reduction.

B. correct: the reduction of aldehydes and ketones with zinc amalgam and concentrated

C. wrong: the Wolff-Kishner reduction uses hydrazine and KOH, not zinc amalgam and HCl.

D. wrong: there is no Friedel-Crafts reduction.

Question 66 Aiman in laboratory dissolve 4g of

Aiman in laboratory dissolve 4g of NaOH in 250 ml of water. The molarity of this solution is:

- A. 0.4 M ✓ **Correct answer**
- B. 4 M
- C. 0.2 M
- D. 0.1 M

A. correct: 4 g of NaOH is 4/40 = 0.1 mol, dissolved in 250 ml (0.25 L), so the molarity is 0.1/0.25 = 0.4 M.

B. wrong: this ignores the volume and the molar mass.

C. wrong: the molarity is 0.4 M.

D. wrong: 0.1 is the number of moles, not the molarity.

Question 67 For all adiabatic processes

For all adiabatic processes

- A. the entropy of the system does not change
- B. the entropy of the system increases
- C. the entropy of the system decreases
- D. the entropy of the system does not decrease ✓ **Correct answer**

A. wrong: this is true only for a reversible adiabatic process.

e entropy need not increase — it stays constant in a reversible adiabatic process.

C. wrong: the entropy never decreases in an adiabatic process.

D. correct: by the second law, in any adiabatic process the entropy of the system does not decrease ($\Delta S \geq 0$).

Question 68 A battery is permanently connected to

A battery is permanently connected to a parallel plate capacitor and the energy stored is x joules. When one plate is moved so that separation of the plate is doubled, the energy now stored in joule is:

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

A. wrong: the stored energy halves, it does not quadruple.

B. wrong: the stored energy halves (the battery holds the voltage constant, so doubling the separation halves the capacitance).

C. correct: the battery is permanently connected, so V is constant; doubling the plate separation halves the capacitance ($C \propto 1/d$), so $U = \frac{1}{2}CV^2$ halves to x/2.

D. wrong: the stored energy halves, it does not quarter. (Noted: a second reproduction's key records B, but with the battery connected the voltage is constant and the energy halves, so the printed key C stands.)

Question 69 If vr is potential gradient then

If $\Delta v/\Delta r$ is potential gradient, then the intensity of electric field at a point is

- A. $\Delta v/\Delta r$

- C. – Δv/Δr ✓ **Correct answer**
- D. Δx/Δr

A. wrong: the sign is missing — the field is the negative potential gradient.

B. wrong: the field does not include the charge q.

C. correct: the electric field intensity is the negative of the potential gradient, E = −ΔV/Δr.

D. wrong: this is not the field.

Question 70 Be poles apart means

'Be poles apart' means:

- A. Either of the two poles
- B. Have nothing in common ✓ **Correct answer**
- C. Leading position in a race
- D. Affects some body greatly

A. wrong: this is not the meaning of the idiom.

B. correct: "to be poles apart" means to have nothing in common (to be completely different).

C. wrong: this is not the meaning of the idiom.

D. wrong: this is not the meaning of the idiom.

Question 71 Phosphodiester linkage is formed between

Phosphodiester linkage is formed between.

- A. Two nucleotide bases
- B. Amino acid
- C. Two sugar ✓ **Correct answer**

A. wrong: the linkage is not formed between the bases.

B. wrong: amino acids are not involved in a phosphodiester linkage.

C. correct: a phosphodiester linkage is formed between the 3′ carbon of one sugar and the 5′ carbon of the next sugar, joined through a phosphate group.

D. wrong as the answer here: the linkage joins the sugars of adjacent nucleotides; the textbook answer is the two sugars. (Noted: a second reproduction's key records D, but the linkage is formed between the two sugars, so the printed key C stands.)

Question 72 A condition of excessive thirst due

A condition of excessive thirst due to diabetes is called:

- A. Polyuria
- B. Glycusuria
- C. Polyphagia
- D. Polydipsia ✓ **Correct answer**

A. wrong: polyuria is excessive urination.

B. wrong: glycosuria is sugar in the urine.

C. wrong: polyphagia is excessive eating.

D. correct: polydipsia is excessive thirst, a symptom of diabetes.

Question 73 Implantation of zygote takes place in

Implantation of zygote takes place in the:

- A. 2nd week ✓ **Correct answer**
- B. 3rd week
- C. 7th week

week

A. correct: implantation of the zygote (blastocyst) takes place about 6–10 days after fertilisation, in the second week.

B. wrong: implantation occurs in the second week, not the third.

C. wrong: implantation occurs in the second week, not the seventh.

D. wrong: implantation occurs in the second week, not the fifth. (Noted: a second reproduction's key records C, but implantation occurs in the second week after fertilisation, so the printed key A stands.)

Question 74 The shape of SnCl2 is

The shape of SnCl2 is:

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

A. wrong: SnCl2 is not linear.

B. wrong: SnCl2 is not trigonal pyramidal.

C. wrong: the lone pair on tin bends the molecule.

D. correct: SnCl2 has a bent (angular) shape because of the lone pair on the tin atom.

Question 75 Which is not true about Grignard

Which is not true about Grignard reagent?

- A. They are highly reactive compounds
- B. They are very stable compounds and can be isolated easily ✓ **Correct answer**
- C. They have synthetic importance

y are represented by general formula RMgX

A. wrong as the not-true statement: Grignard reagents are highly reactive.

B. correct as the not-true statement: Grignard reagents are highly reactive and cannot be isolated easily (they react with moisture and air).

C. wrong as the not-true statement: Grignard reagents are of great synthetic importance.

D. wrong as the not-true statement: Grignard reagents are represented by RMgX.

Question 76 Conc HCl is added to a

Conc. HCl is added to a metal salt and then subjected to flame test on platinum wire. It imparts crimson color to the flame. Which metal salt it is?

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

A. wrong: sodium imparts a golden-yellow colour to the flame.

B. wrong: potassium imparts a lilac (violet) colour to the flame.

C. correct: strontium imparts a crimson (deep red) colour to the flame.

D. wrong: calcium imparts a brick-red colour to the flame.

Question 77 The unit of the electric field

The unit of the electric field is:

- A. N/C
- B. V/m
- C. J/C.m
- D. All of the above ✓ **Correct answer**

the answer here: the electric field can be expressed in N/C, but the question asks for the unit and all the listed forms are correct.

B. wrong as the answer here: the electric field can be expressed in V/m, but all the listed forms are correct.

C. wrong as the answer here: the electric field can be expressed in J/C·m, but all the listed forms are correct.

D. correct: the electric field is expressed in N/C, V/m and J/C·m — all are equivalent units.

Question 78 The electric field due to uniform

The electric field due to uniform distribution of charge on a spherical shell is zero.

- A. Every where
- B. Only at the center of shell
- C. Only inside the shell ✓ **Correct answer**
- D. Only one side of the shell

A. wrong: the field is not zero everywhere.

B. wrong: the field is zero everywhere inside the shell, not only at the centre.

C. correct: the electric field due to a uniformly charged spherical shell is zero at every point inside the shell.

D. wrong: the field is zero everywhere inside the shell.

Question 79 The quantity 0E2 has the significance

The quantity ½ ε0E2 has the significance of

- A. energy/farad
- B. Energy/coulomb
- C. Energy/volume ✓ **Correct answer**

A. wrong: $\frac{1}{2}\varepsilon_0 E^2$ is an energy density.

B. wrong: $\frac{1}{2}\varepsilon_0 E^2$ is an energy density.

C. correct: $\frac{1}{2}\varepsilon_0 E^2$ is the energy stored per unit volume (energy density) of an electric field.

D. wrong: $\frac{1}{2}\varepsilon_0 E^2$ is an energy density.

Question 80 The rising price of electricity has

The rising price of electricity has _____ affected the less fortunate.

- A. positively
- B. not
- C. adversely ✓ **Correct answer**
- D. slowly

A. wrong: a rising price does not affect the less fortunate positively.

B. wrong: "has not affected" does not fit the sense of the sentence.

C. correct: "The rising price of electricity has adversely affected the less fortunate."

D. wrong: "slowly" does not convey the harmful effect meant here.

Question 81 Smallest gametophyte is present in

Smallest gametophyte is present in:

- A. Adiantum
- B. Funaria
- C. Marchantia
- D. Angiosperms ✓ **Correct answer**

A. wrong: the gametophyte of Adiantum (a fern) is a small prothallus but not the smallest.

e gametophyte of Funaria (a moss) is the dominant plant, not the smallest.

C. wrong: the gametophyte of Marchantia (a liverwort) is the dominant plant, not the smallest.

D. correct: angiosperms have the smallest gametophyte — reduced to a few cells (the embryo sac in the ovule and the pollen grain).

Question 82 Incubation period of HCV is

Incubation period of “HCV” is:

- A. 2-6 weeks
- B. 4-10 weeks
- C. 4-20 weeks
- D. 4-26 weeks ✓ **Correct answer**

A. wrong: 2–6 weeks is the incubation period of hepatitis A.

B. wrong: 4–10 weeks is the window period for anti-HCV detection, not the incubation period.

C. wrong: 4–20 weeks is the incubation period of hepatitis B.

D. correct: the incubation period of hepatitis C is 4–26 weeks (Robbins 9th ed.; the standard range is 2–26 weeks with an average of 6–7 weeks). (Noted: a second reproduction's key records C, but 4–20 weeks is the hepatitis B range; the printed key D stands.)

Question 83 Osteopenia starts at the age of

Osteopenia starts at the age of:

- A. 30-40
- B. 30-35 ✓ **Correct answer**
- C. 40-45

A. wrong as the answer here: bone mass peaks at about 35 and loss begins then, so the textbook start is 30–35.

B. correct: osteopenia (bone loss) starts at the age of 30–35, when bone mass has peaked and begins to decline.

C. wrong: bone loss begins earlier, at 30–35.

D. wrong: bone loss begins much earlier, at 30–35. (Noted: a second reproduction's key records A, but bone mass peaks at about 35, so the printed key B stands.)

Question 84 The order of reducing power of

The order of reducing power of halide ion is:

- A. I- > Br- > Cl- > F- ✓ **Correct answer**
- B. F- > Cl- > Br- > I-
- C. I- > Cl- > F- > Br-
- D. Br- > Cl- > I- > F-

A. correct: the reducing power of the halide ions decreases down the group, so I^- > Br^- > Cl^- > F^-.

B. wrong: this is the reverse order.

C. wrong: this is not the order of reducing power.

D. wrong: this is not the order of reducing power.

Question 85 Stable electronic configuration of Cu29 is

Stable electronic configuration of Cu(29) is:

- A. [Ar] 4S2 3d4
- B. [Ar] 4S0 3d10

4S1 3d10 ✓ **Correct answer**

- D. [Ar] 4S2 3d7 4p2

A. wrong: copper is not $4s^2 3d^9$ (the ground state is $4s^1 3d^{10}$).

B. wrong: copper keeps one electron in the 4s orbital.

C. correct: the stable electronic configuration of Cu(29) is [Ar] $4s^1 3d^{10}$ — the half-filled 4s and completely filled 3d subshells are extra stable.

D. wrong: this is not the configuration of copper.

Question 86 The presence of microorganisms in drinking

The presence of microorganisms in drinking water is determined by:

- A. COD
- B. TOC
- C. BOD ✓ **Correct answer**
- D. TDS

A. wrong: COD (chemical oxygen demand) measures the oxygen needed to oxidise all organic matter chemically.

B. wrong: TOC (total organic carbon) measures total organic carbon.

C. correct: the presence of microorganisms in drinking water is determined by the BOD (biochemical oxygen demand) — the oxygen consumed by microorganisms in decomposing organic matter.

D. wrong: TDS (total dissolved solids) measures dissolved solids, not microorganisms.

Question 87 For ohmic substance the electron drift

For ohmic substance, the electron drift velocity is proportional to:

- A. Cross sectional of sample

length of sample

- C. The mass of an electron
- D. The electric field in the sample ✓ **Correct answer**

A. wrong: the drift velocity does not depend on the cross-sectional area.

B. wrong: the drift velocity does not depend on the length of the sample.

C. wrong: the drift velocity does not depend on the mass of the electron.

D. correct: for an ohmic substance the drift velocity is proportional to the electric field ($v_d = \mu E$).

Question 88 The sum of the emf and

The sum of the e.m.f and potential differences around a closed circuit is zero is a consequence of:

- A. Ohm’s law
- B. Newton’s 2nd law
- C. Conservation of energy ✓ **Correct answer**
- D. Conservation of charge

A. wrong: the closed-loop sum of e.m.f. and potential differences is Kirchhoff's voltage law.

B. wrong: this is not a consequence of Newton's second law.

C. correct: Kirchhoff's voltage law (the sum of e.m.f. and potential differences around a closed circuit is zero) is a consequence of the conservation of energy.

D. wrong: conservation of charge gives Kirchhoff's current law, not the voltage law.

Question 89 Four wires meet at a junction

Four wires meet at a junction. The first carries 4A in to the junction, the second carries

e junction, and third carries 2A out of the junction. The fourth carries:

- A. 7A out of the junction
- B. 7A into the junction
- C. 3A out of the junction
- D. 3A in to the junction ✓ **Correct answer**

A. wrong: by Kirchhoff's current law the fourth wire must carry 3 A into the junction.

B. wrong: the total current in must equal the total current out.

C. wrong: the fourth wire must carry 3 A into the junction.

D. correct: 4 A in + x = 5 A out + 2 A out, so x = 3 A into the junction.

Question 90 He said May this child live

He said, “May this child live long!” [Indirect form of the sentence is:]

- A. He prayed that that child may live long.
- B. He prayed that that child will live long.
- C. He prayed that that child might live long. ✓ **Correct answer**
- D. He said that child may live long.

A. wrong: in indirect speech "may" changes to "might".

B. wrong: "will" is not the correct change of "may" here.

C. correct: the optative "May this child live long!" becomes "He prayed that that child might live long."

D. wrong: "said" is not used for a prayer, and "may" must change to "might".

Question 91 Blood pressure towards the brain during

Blood pressure towards the brain during rest hours is:

mm/minute

- B. 900 mm/minute
- C. 750 mm/minute ✓ **Correct answer**
- D. 730 mm/minute

A. wrong: the textbook value is 750 mm/minute.

B. wrong: the textbook value is 750 mm/minute.

C. correct: the blood pressure (flow) towards the brain during rest hours is 750 mm/minute.

D. wrong: the textbook value is 750 mm/minute.

Question 92 Photo-respiration can generate

Photo-respiration can generate:

- A. 4-ATP
- B. 36-ATP
- C. 32-ATP
- D. NO-ATP ✓ **Correct answer**

A. wrong: photorespiration does not generate ATP.

B. wrong: photorespiration does not generate ATP.

C. wrong: photorespiration does not generate ATP.

D. correct: photorespiration generates no ATP — it is a wasteful process that consumes energy.

Question 93 Dark reaction gets completed by the

Dark reaction gets completed by the regeneration of:

- A. PGA

- C. RUBP ✓ **Correct answer**
- D. RUBISCO

A. wrong: the dark reaction is completed by the regeneration of RuBP, not PGA.

B. wrong: the dark reaction is completed by the regeneration of RuBP, not PGAL.

C. correct: the dark reaction (Calvin cycle) is completed by the regeneration of RuBP (ribulose bisphosphate), which accepts CO2 again.

D. wrong: RuBisCO is the enzyme, not the regenerated molecule.

Question 94 Sucrose on hydrolysis yield

Sucrose on hydrolysis yield:

- A. Glucose
- B. Glucose and fructose ✓ **Correct answer**
- C. Glucose and maltose
- D. Maltose and fructose

A. wrong: sucrose hydrolyses to glucose and fructose.

B. correct: sucrose on hydrolysis yields glucose and fructose (invert sugar).

C. wrong: sucrose does not yield maltose.

D. wrong: sucrose does not yield maltose.

Question 95 N2 3H2 2NH3 In the above

N2 + 3H2 ↔️ 2NH3 In the above reaction the limiting reagent is:

- A. N2
- B. H2
- C. Ammonia

ne of the above ✓ **Correct answer**

A. wrong: no amounts are given, so no limiting reagent can be identified.

B. wrong: no amounts are given, so no limiting reagent can be identified.

C. wrong: ammonia is the product, not a limiting reagent.

D. correct: with no amounts of N2 and H2 given, there is no limiting reagent.

Question 96 If absolute temperature of the gas

If absolute temperature of the gas is doubled and pressure is increased 4 times, then the volume becomes:

- A. Half ✓ **Correct answer**
- B. Double
- C. 4 times
- D. Unchanged

A. correct: from V = nRT/P, doubling T and increasing P four times gives V′ = (2/4)V = V/2, so the volume becomes half.

B. wrong: the volume becomes half.

C. wrong: the volume becomes half.

D. wrong: the volume becomes half.

Question 97 Four 20 resistors are connected in

Four 20 Ω resistors are connected in parallel and combination is connected to a 20 V emf device. The current in the device is:

- A. 0.25 A
- B. 1.0 A
- C. 4.0 A ✓ **Correct answer**

A. wrong: the equivalent resistance is 5 Ω, so the current is 4 A.

B. wrong: the equivalent resistance is 5 Ω, so the current is 4 A.

C. correct: four 20 Ω resistors in parallel give 20/4 = 5 Ω, so I = V/R = 20/5 = 4.0 A.

D. wrong: the equivalent resistance is 5 Ω, so the current is 4 A.

Question 98 An electron is moving north in

An electron is moving north in a region when the magnetic field is south. The magnetic force exerted on the electron is:

- A. Zero ✓ **Correct answer**
- B. Up
- C. Down
- D. East

A. correct: the electron moves north while the magnetic field points south — the velocity and the field are antiparallel, so v × B = 0 and the magnetic force is zero.

B. wrong: the force is zero.

C. wrong: the force is zero.

D. wrong: the force is zero.

Question 99 A001A moving coil Galvanometer of 5

A0.01A moving coil Galvanometer of 5 Ω resistance can be converted into a 0.2A ammeter by a resistance R with the Galvanometer when R is:

- A. 0.25 Ω in parallel ✓ **Correct answer**
- B. 0.25 Ω in series
- C. 0.50 Ω in parallel

A. correct: the shunt resistance is R = Ig·Rg/(I − Ig) = 0.01 × 5/(0.2 − 0.01) = 0.05/0.19 ≈ 0.25 Ω, connected in parallel with the galvanometer.

B. wrong: the shunt must be connected in parallel.

C. wrong: the shunt resistance is about 0.25 Ω, not 0.50 Ω.

D. wrong: the shunt must be connected in parallel and its value is about 0.25 Ω.

Question 100 Your friend proved more sympathetic than

Your friend proved more sympathetic than I expected he _____ do.

- A. will
- B. shall
- C. would ✓ **Correct answer**
- D. should

A. wrong: "would" is needed after the past-tense expectation.

B. wrong: "would" is needed after the past-tense expectation.

C. correct: "Your friend proved more sympathetic than I expected he would do."

D. wrong: "would" is needed after the past-tense expectation.

Question 101 Human body thermostat is

Human body thermostat is:

- A. Medulla
- B. Medulla oblongata
- C. Body fluid
- D. Hypothalamus ✓ **Correct answer**

e medulla does not control body temperature.

B. wrong: the medulla oblongata does not control body temperature.

C. wrong: body fluid is not the thermostat.

D. correct: the hypothalamus is the thermostat of the human body — it regulates body temperature.

Question 102 How many pairs of cranial nerves

How many pairs of cranial nerves are mixed in nature?

- A. 02 pairs
- B. 04 pairs ✓ **Correct answer**
- C. 06 pairs
- D. 08 pairs

A. wrong: four pairs of cranial nerves are mixed.

B. correct: four pairs of cranial nerves are mixed in nature — the trigeminal (V), facial (VII), glossopharyngeal (IX) and vagus (X) nerves.

C. wrong: four pairs of cranial nerves are mixed.

D. wrong: four pairs of cranial nerves are mixed.

Question 103 80S ribosome is formed by the

"80–S" ribosome is formed by the combination of:

- A. 30S and 40S
- B. 70S and 10S
- C. 50S and 30S
- D. 60S and 40S ✓ **Correct answer**

A. wrong: 30S + 40S gives 70S, not 80S.

these do not combine to form the 80S ribosome.

C. wrong: 50S + 30S gives the 70S (prokaryotic) ribosome.

D. correct: the eukaryotic 80S ribosome is formed by the combination of the 60S and 40S subunits.

Question 104 The electronic transition that is involved

The electronic transition that is involved in the visible region is:

- A. σ – σ
- B. d – d ✓ **Correct answer**
- C. π – π
- D. π – σ

A. wrong: σ–σ* transitions occur in the far ultraviolet region.

B. correct: d–d electronic transitions are involved in the visible region (they give transition-metal complexes their colour).

C. wrong: π–π* transitions occur in the ultraviolet region.

D. wrong: π–σ* transitions occur in the ultraviolet region.

Question 105 Hydrolysis of ester in the presence

Hydrolysis of ester in the presence of KOH is called:

- A. Esterification
- B. Decarboxylation
- C. Saponification ✓ **Correct answer**
- D. Neutralization

A. wrong: esterification is the formation of an ester from an acid and an alcohol.

B. wrong: decarboxylation is the loss of CO_2.

e hydrolysis of an ester in the presence of KOH (alkaline hydrolysis) is called saponification.

D. wrong: neutralisation is an acid reacting with a base.

Question 106 Salts which dissolve in water with

Salts which dissolve in water with evolution of heat. The effect of temperature on their solubility will be:

- A. Increases with increase in temperature
- B. Decreases with increase in temperature ✓ **Correct answer**
- C. Solubility does not change
- D. In some cases it increases while in others it decreases

A. wrong: for a salt that dissolves with evolution of heat, solubility decreases with rising temperature.

B. correct: the dissolution is exothermic, so by Le Chatelier's principle raising the temperature shifts the equilibrium backwards and the solubility decreases.

C. wrong: the solubility decreases with rising temperature.

D. wrong: for an exothermic dissolution the solubility decreases with rising temperature.

Question 107 Two long parallel wires x and

Two long parallel wires x and y carrying a current of 3A and 5A respectively. The force per unit length experienced by x is 5 × 10-5N to the right, the force per unit length experienced by wire y is:

- A. 2 × 10-5N to the left
- B. 3 × 10-5N to the right
- C. 5 × 10-5N to the right
- D. 5 × 10-5N to the left ✓ **Correct answer**

e force is equal in magnitude to that on wire x.

B. wrong: the force is equal in magnitude and opposite in direction.

C. wrong: by Newton's third law the force on wire y is in the opposite direction.

D. correct: by Newton's third law the force on wire y is equal in magnitude (5×10^{-5} N per unit length) and opposite in direction (to the left).

Question 108 The charged particle is situated in

The charged particle is situated in a region of space and it experiences a force only when it is in motion. It can be deduced that the region encloses:

- A. Both electric and magnetic field
- B. Both magnetic and gravitational field
- C. A magnetic field only ✓ **Correct answer**
- D. An electric field only

A. wrong: an electric field would exert a force on a stationary charge.

B. wrong: a gravitational field would exert a force on a stationary charge.

C. correct: a magnetic field exerts a force only on a moving charge, while an electric field exerts a force on a stationary charge too — so the region encloses a magnetic field only.

D. wrong: an electric field would exert a force on the charge even at rest.

Question 109 If the direction of initial velocity

If the direction of initial velocity of the charged particle is neither along nor perpendicular to that of magnetic field then the orbit will be:

- A. Circle
- B. Helix ✓ **Correct answer**
- C. Ellipse

straight line

A. wrong: a circular orbit needs the velocity perpendicular to the field.

B. correct: when the initial velocity is neither along nor perpendicular to the magnetic field, the particle follows a helical (spiral) path.

C. wrong: the path is a helix, not an ellipse.

D. wrong: a straight line needs the velocity along the field.

Question 110 Choose the correct sentence

Choose the correct sentence:

- A. If I knew him better, I would have insisted that he change the hour of the lecture.
- B. If I knew him better, I would have insisted that he changed the hour of the lecture.
- C. If I knew him better, I would insist that he change the hour of the lecture. ✓ **Correct answer**
- D. If I knew him better, I would insist for him to change the hour of the lecture.

A. wrong: this mixes the past simple "knew" with "would have insisted" — the tenses do not agree.

B. wrong: this mixes the tenses and uses "changed" instead of the subjunctive "change".

C. correct: a proper second conditional — "If I knew him better, I would insist that he change the hour of the lecture" (subjunctive "change" after "insist that").

D. wrong: "insist for him to change" is ungrammatical. (Noted: a second reproduction's key records A, but A mixes past simple with "would have", so the printed key C stands.)

Question 111 The interval between two successive division

The interval between two successive division of bacteria is called:

ogical time

- B. Population time
- C. Growth time
- D. Generation time ✓ **Correct answer**

A. wrong: the interval between two successive divisions is the generation time.

B. wrong: the interval between two successive divisions is the generation time.

C. wrong: the interval between two successive divisions is the generation time.

D. correct: the interval between two successive divisions of bacteria is called the generation time.

Question 112 Most disease symptoms appear during

Most disease symptoms appear during.

- A. Lag phase
- B. Log phase ✓ **Correct answer**
- C. Die
- D. Generation time

A. wrong: most disease symptoms appear during the log phase.

B. correct: most disease symptoms appear during the log (exponential) phase, when the bacterial population is growing fastest.

C. wrong: most disease symptoms appear during the log phase.

D. wrong: most disease symptoms appear during the log phase.

Question 113 Endotoxins are released only when bacteria

Endotoxins are released only when bacteria

- A. Excrete

- C. Decline phase ✓ **Correct answer**
- D. Stop phase

A. wrong: endotoxins are not excreted by living bacteria.

B. wrong: endotoxins are not released during reproduction.

C. correct: endotoxins (part of the bacterial cell wall) are released only when bacteria die and break apart, in the decline (death) phase.

D. wrong: endotoxins are released in the decline phase.

Question 114 The osmotic pressure of dilute solution

The osmotic pressure of dilute solution is given by the formula:

- A. π = RTC / m
- B. π = M / RTC
- C. π = RTC / M ✓ **Correct answer**
- D. None of the above

A. wrong: the correct formula is π = RTC/M.

B. wrong: the correct formula is π = RTC/M.

C. correct: the osmotic pressure of a dilute solution is π = RTC/M, where C is the concentration in g/L and M is the molar mass.

D. wrong: the formula π = RTC/M is correct.

Question 115 Select the test used for the

Select the test used for the estimation of glucose in blood and urine?

- A. Tollen’s reagent test
- B. Fehling’s solution test

edict's solution test

- D. All of the above ✓ **Correct answer**

A. wrong as the answer here: Tollen's reagent does detect glucose, but so do the other two tests.

B. wrong as the answer here: Fehling's solution does detect glucose, but so do the other two tests.

C. wrong as the answer here: Benedict's solution does detect glucose, but so do the other two tests.

D. correct: glucose (a reducing sugar) in blood and urine is estimated by Tollen's reagent, Fehling's solution and Benedict's solution — all three tests are used. (Noted: a second reproduction's key records C, but all three reagents detect glucose, so the printed key D stands.)

Question 116 Excess of ethanol is heated with

Excess of ethanol is heated with conc. sulphuric acid keeping the temperature 140°C. The product formed is:

- A. $C_2H_5OC_2H_5 + H_2O$ ✓ **Correct answer**
- B. C_2H_4
- C. C_2H_5OH
- D. C_2H_6

A. correct: excess ethanol heated with concentrated sulphuric acid at 140 °C gives diethyl ether and water.

B. wrong: ethene is formed at 170 °C, not 140 °C.

C. wrong: ethanol is the reactant, not the product.

D. wrong: ethane is not formed.

117 The mechanical energy spent by the

The mechanical energy spent by the external agency is converted into electrical energy stored in the coil. This relates to:

- A. Ohm’s law
- B. Coulomb’s law
- C. Lenz’s law ✓ **Correct answer**
- D. Newton’s law of motion

A. wrong: this is not Ohm's law.

B. wrong: this is not Coulomb's law.

C. correct: the mechanical energy spent by the external agency is converted into electrical energy stored in the coil — the induced current opposes the change, which is Lenz's law.

D. wrong: this is not Newton's law of motion.

Question 118 The efficiency of a transformer which

The efficiency of a transformer which draws a power of 20 watt is 60%, the power supplied by it is:

- A. 5 W
- B. 1.2 W
- C. 6 W
- D. 12 W ✓ **Correct answer**

A. wrong: the power supplied is 60% of 20 W = 12 W.

B. wrong: the power supplied is 60% of 20 W = 12 W.

C. wrong: the power supplied is 60% of 20 W = 12 W.

D. correct: the power supplied is 60% of the 20 W drawn, i.e. 0.60 × 20 = 12 W.

119 A long solenoid has length L

A long solenoid has length L and total number of N turns, each of which has a cross sectional area A, its Inductance:

- A. μ0 N2 Al
- B. μ0 N2 A/l ✓ **Correct answer**
- C. μ0 N2 l/A
- D. μ0Nl/A

A. wrong: the inductance is $\mu_0 N^2 A/l$.

B. correct: the inductance of a long solenoid is $L = \mu_0 N^2 A/l$.

C. wrong: the inductance is $\mu_0 N^2 A/l$.

D. wrong: the inductance is $\mu_0 N^2 A/l$.

Question 120 I insist the withdrawal of your

I insist _____ the withdrawal of your statement.

- A. for
- B. on ✓ **Correct answer**
- C. at
- D. in

A. wrong: "insist for" is not correct here.

B. correct: "I insist on the withdrawal of your statement."

C. wrong: "insist at" is not correct here.

D. wrong: "insist in" is not correct here.

121 A protist that forms sea-weeds is

A protist that forms sea-weeds is:

- A. Red algae
- B. Brown algae ✓ **Correct answer**
- C. Green algae
- D. Diatoms

A. wrong: red algae do not form the sea-weeds referred to here.

B. correct: brown algae (Phaeophyta) are the protists that form sea-weeds.

C. wrong: green algae do not form the sea-weeds referred to here.

D. wrong: diatoms are unicellular, not sea-weeds.

Question 122 Basidiocarp is formed in the

Basidiocarp is formed in the:

- A. Secondary mycelium
- B. Primary mycelium
- C. Tertiary mycelium ✓ **Correct answer**
- D. Pathogenic parasites

A. wrong: the basidiocarp is formed in the tertiary mycelium.

B. wrong: the basidiocarp is formed in the tertiary mycelium.

C. correct: the basidiocarp (fruiting body) is formed in the tertiary mycelium of basidiomycetes.

D. wrong: the basidiocarp is formed in the tertiary mycelium.

123 Best known Apicomplex is the

Best known “Apicomplex” is the:

- A. Obligate parasites
- B. Facultative parasites
- C. Malarial parasites ✓ **Correct answer**
- D. Pathogenic parasites

A. wrong: the best-known apicomplexan is the malarial parasite.

B. wrong: the best-known apicomplexan is the malarial parasite.

C. correct: the best-known apicomplexan is the malarial parasite (Plasmodium).

D. wrong: the best-known apicomplexan is the malarial parasite.

Question 124 First law of thermodynamics is expressed

First law of thermodynamics is expressed as:

- A. $q = \Delta E + W$
- B. $\Delta E = q - W$
- C. $q = \Delta E + P\Delta V$
- D. All of the above ✓ **Correct answer**

A. wrong as the answer here: this is a correct form of the first law, but all three forms are correct.

B. wrong as the answer here: this is a correct form of the first law, but all three forms are correct.

C. wrong as the answer here: this is a correct form of the first law, but all three forms are correct.

D. correct: all three are equivalent forms of the first law of thermodynamics.

125 The rate law equation for reaction

The rate law equation for reaction is given as dx/dt = K [FeCl3] [KI]2 the reaction is:

- A. First order
- B. Second order
- C. Third order ✓ **Correct answer**
- D. Pseudo first order

A. wrong: the overall order is 1 + 2 = 3.

B. wrong: the overall order is 1 + 2 = 3.

C. correct: the rate law dx/dt = K[FeCl3][KI]^2 is first order in FeCl3 and second order in KI, so the overall order is 3.

D. wrong: the reaction is third order.

Question 126 Choose the correct order of reactivity

Choose the correct order of reactivity of alkyl halides?

- A. R – I > R – Br > R – Cl > R – F ✓ **Correct answer**
- B. R – Br > R – I > R – F > R – Cl
- C. R – F > R – Cl > R – Br > R – I
- D. R – Cl > R – I > R – Br > R – I

A. correct: the reactivity of alkyl halides follows the order R–I > R–Br > R–Cl > R–F (the C–I bond is the weakest and most easily broken).

B. wrong: the reactivity order is R–I > R–Br > R–Cl > R–F.

C. wrong: this is the reverse order.

D. wrong: the reactivity order is R–I > R–Br > R–Cl > R–F.

127 Instantaneous emf at instant t is

Instantaneous emf at instant t is ε = 20 sin (100πt). The frequency of alternating current is

- A. 100 Hz
- B. 200 Hz
- C. 50 Hz ✓ **Correct answer**
- D. 150 Hz

A. wrong: the frequency is 50 Hz.

B. wrong: the frequency is 50 Hz.

C. correct: ε = 20 sin(100πt), so ω = 100π = 2πf, giving f = 50 Hz.

D. wrong: the frequency is 50 Hz.

Question 128 A flat coil of wire having

A flat coil of wire having 5 turns, has an inductance L. The inductance of similar coil having 10 turns is:

- A. 4L ✓ **Correct answer**
- B. L/4
- C. μL
- D. L

A. correct: inductance is proportional to the square of the number of turns ($L \propto N^2$), so doubling the turns from 5 to 10 gives 4L.

B. wrong: the inductance increases to 4L.

C. wrong: the inductance increases to 4L.

D. wrong: the inductance increases to 4L.

129 Semi-conductor material have

Semi-conductor material have

- A. Ionic bond
- B. Covalent bond ✓ **Correct answer**
- C. Mutual bond
- D. Metallic bond

A. wrong: semiconductors have covalent bonds.

B. correct: semiconductor materials (silicon, germanium) have covalent bonds.

C. wrong: there is no such bond in semiconductors.

D. wrong: semiconductors have covalent bonds.

Question 130 She does not wash clothes on

She does not wash clothes on Fridays. [Passive form of the sentence is:]

- A. Clothes are not being washed by her on Fridays.
- B. Clothes were not washed by her on Fridays.
- C. Clothes were not being washed by her on Fridays.
- D. Clothes are not washed by her on Fridays. ✓ **Correct answer**

A. wrong: the active sentence is in the simple present, so the passive must be simple present.

B. wrong: the passive must be in the present tense.

C. wrong: the passive must be in the present tense.

D. correct: the passive of "She does not wash clothes on Fridays" is "Clothes are not washed by her on Fridays."

131 Misuse of cannabis results

Misuse of cannabis results.

- A. Psychosis ✓ **Correct answer**
- B. Euphoria
- C. Paranoia
- D. Photophobia

A. correct: misuse of cannabis results in psychosis (a mental disorder with loss of contact with reality).

B. wrong: euphoria is a short-term effect, not the result of misuse.

C. wrong: the textbook answer for cannabis misuse is psychosis.

D. wrong: photophobia is not caused by cannabis misuse.

Question 132 Outer wall of Guard cells is

Outer wall of Guard cells is:

- A. Thin & elastic ✓ **Correct answer**
- B. Thick & elastic
- C. Thin & non elastic
- D. Thick & non elastic

A. correct: the outer wall of guard cells is thin and elastic, while the inner wall is thick and inelastic — this difference opens and closes the stoma.

B. wrong: the outer wall is thin and elastic.

C. wrong: the outer wall is thin and elastic.

D. wrong: the thick and inelastic wall is the inner wall.

Question 133 The critical day length of a

The critical day length of a short-day plant is:

- A. 11:00 hours
- B. 15:00 hours
- C. 11 ½ hours
- D. 15 ½ hours ✓ **Correct answer**

A. wrong: the critical day length of a short-day plant is 15½ hours.

B. wrong: the critical day length of a short-day plant is 15½ hours.

C. wrong: the critical day length of a short-day plant is 15½ hours.

D. correct: the critical day length of a short-day plant (e.g. Xanthium) is 15½ hours — it flowers only when the day length is shorter than this.

Question 134 Select ligand which is bidentate and

Select ligand which is bidentate and can form chelates.

- A. CH3NH2
- B. PH3
- C. H2O
- D. CH2NH2 – CH2NH2 ✓ **Correct answer**

A. wrong: methylamine is a monodentate ligand.

B. wrong: phosphine is a monodentate ligand.

C. wrong: water is a monodentate ligand.

D. correct: ethylenediamine (CH2NH2–CH2NH2) is a bidentate ligand that forms chelates (ring complexes) with metal ions.

135 The proton acceptor is

The proton acceptor is:

- A. NH3 ✓ **Correct answer**
- B. BF3
- C. HCl
- D. H+

A. correct: a proton acceptor is a base, and ammonia (NH3) accepts a proton to form $NH4^{+}$.

B. wrong: BF3 is an electron-pair acceptor (Lewis acid), not a proton acceptor.

C. wrong: HCl is a proton donor (acid).

D. wrong: H^{+} is the proton itself.

Question 136 Which one of the following acids

Which one of the following acids has a strong conjugate base?

- A. CH3COOH ✓ **Correct answer**
- B. HCl
- C. HNO3
- D. H2SO4

A. correct: acetic acid is a weak acid, so its conjugate base ($CH3COO^{-}$) is strong.

B. wrong: HCl is a strong acid, so its conjugate base is weak.

C. wrong: HNO3 is a strong acid, so its conjugate base is weak.

D. wrong: H2SO4 is a strong acid, so its conjugate base is weak.

137 The behavior of ferromagnetic domains in

The behavior of ferromagnetic domains in an applied magnetic field gives rise to

- A. Hysteresis ✓ **Correct answer**
- B. Ferromagnetism
- C. The Curie law
- D. Gauss’s law for magnetism

A. correct: the behaviour of ferromagnetic domains in an applied magnetic field gives rise to hysteresis (the lag of magnetisation behind the field).

B. wrong: ferromagnetism is the property itself, not the effect described.

C. wrong: the Curie law relates susceptibility to temperature in paramagnets.

D. wrong: Gauss's law for magnetism states that magnetic monopoles do not exist.

Question 138 The shear modulus of elasticity G

The shear modulus of elasticity G is:

- A. Al / Fθ
- B. Fl / Aθ
- C. F / Aθ ✓ **Correct answer**
- D. Aθ / F

A. wrong: the shear modulus is F/Aθ.

B. wrong: the shear modulus is F/Aθ.

C. correct: the shear modulus of elasticity is G = F/(Aθ), where F/A is the shear stress and θ is the shear strain.

D. wrong: this is the reciprocal of the shear modulus.

139 In P type substances the charge

In P type substances, the charge carriers in minorities are:

- A. Holes
- B. Electrons ✓ **Correct answer**
- C. Protons
- D. Positive ions

A. wrong: holes are the majority carriers in a p-type substance.

B. correct: in a p-type substance the majority carriers are holes and the minority carriers are electrons.

C. wrong: protons are not charge carriers in a semiconductor.

D. wrong: positive ions are not the minority carriers.

Question 140 The local inns are bursting at

The local inns are bursting at the seams and may not be able to accommodate anymore. [The underlined phrase means]:

- A. Unhygienic
- B. Overcrowded ✓ **Correct answer**
- C. Empty
- D. Shutting Down

A. wrong: "bursting at the seams" means overcrowded.

B. correct: "bursting at the seams" means overcrowded — the inns are completely full.

C. wrong: "bursting at the seams" means the opposite — overcrowded.

D. wrong: "bursting at the seams" means overcrowded.

141 The larva of balanoglossus Hemichordate is

The larva of balanoglossus (Hemichordate) is called:

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

A. wrong: bipinnaria is the larva of a starfish.

B. wrong: radiolaria are not the larva of Balanoglossus.

C. correct: the larva of Balanoglossus (a hemichordate) is called the tornaria larva.

D. wrong: trochophore is the larva of annelids and molluscs.

Question 142 The organs of excretion in crustacean

The organs of excretion in crustacean are:

- A. Coxal glands ✓ **Correct answer**
- B. Flame cells
- C. Malpighian tubules
- D. Nephridia

A. correct: the organs of excretion in crustaceans are the coxal glands (green/antennal glands).

B. wrong: flame cells are the excretory organs of flatworms.

C. wrong: Malpighian tubules are the excretory organs of insects.

D. wrong: nephridia are the excretory organs of annelids.

143 All of the following are micronutrients

All of the following are micronutrients except:

- A. Iron
- B. Copper
- C. Zinc
- D. Magnesium ✓ **Correct answer**

A. wrong as the answer here: iron is a micronutrient.

B. wrong as the answer here: copper is a micronutrient.

C. wrong as the answer here: zinc is a micronutrient.

D. correct: magnesium is a macronutrient (needed in large amounts), while iron, copper and zinc are micronutrients.

Question 144 What is true about modern methods

What is true about modern methods used in the determination of the structure of compounds?

- A. Accurate but more time consuming
- B. Accurate, rapid but chemicals are used in large amounts
- C. Accurate, rapid but sophisticated and complicated
- D. Accurate, simple and less time consuming ✓ **Correct answer**

A. wrong: modern methods are accurate and less time consuming.

B. wrong: modern methods use only small amounts of chemicals.

C. wrong: modern methods are accurate, simple and less time consuming.

D. correct: modern methods (spectroscopy) for determining the structure of compounds are accurate, simple and less time consuming.

145 100 transmission in IR spectroscopy means

100% transmission in IR spectroscopy means:

- A. No absorption ✓ **Correct answer**
- B. 50% absorption
- C. 75% absorption
- D. 100% absorption

A. correct: 100% transmission in IR spectroscopy means no absorption — all the radiation passes through the sample.

B. wrong: 100% transmission means no absorption.

C. wrong: 100% transmission means no absorption.

D. wrong: 100% transmission means no absorption.

Question 146 The pH of 0001 M aqueous

The pH of 0.001 M aqueous solution of NaOH is:

- A. 6
- B. 13
- C. 11 ✓ **Correct answer**
- D. 12

A. wrong: the pH of 0.001 M NaOH is 11.

B. wrong: the pH of 0.001 M NaOH is 11.

C. correct: 0.001 M NaOH gives $[OH^-] = 10^{-3}$ M, so pOH = 3 and pH = 14 − 3 = 11.

D. wrong: the pH of 0.001 M NaOH is 11.

147 In an unbiased P-N junction

In an unbiased P-N junction

- A. The electric potential vanishes every where
- B. The electric field vanishes every where
- C. The diffusion current vanishes every where
- D. The diffusion and drift currents cancel each other ✓ **Correct answer**

A. wrong: a built-in potential exists across the junction.

B. wrong: an electric field exists in the depletion region.

C. wrong: the diffusion current exists but is balanced by the drift current.

D. correct: in an unbiased p-n junction the diffusion current and the drift current are equal and opposite, so they cancel each other.

Question 148 The isotope which decay by -1

The isotope which decay by β-1 emission to produce 48Cd111 is

- A. 47Ag111 ✓ **Correct answer**
- B. 47Ag110
- C. 47Ag112
- D. 49In111

A. correct: in β^- decay the atomic number increases by one with no change in mass number, so $^{47}Ag^{111}$ decays to $^{48}Cd^{111}$.

B. wrong: the mass number must be 111.

C. wrong: the mass number must be 111.

D. wrong: β^- decay increases the atomic number by one, so the parent is $^{47}Ag^{111}$, not $^{49}In^{111}$.

149 An electron is projected with a

An electron is projected with a velocity V into a region where there exists a uniform electric field of strength E perpendicular to a uniform magnetic field B. If the electron velocity is to remain constant, V must be

- A. of magnitude B/E and parallel to B
- B. of magnitude E/B and parallel to B
- C. of magnitude B/E and perpendicular to both E and B
- D. of magnitude E/B and perpendicular to both E and B ✓ **Correct answer**

A. wrong: the velocity must be E/B and perpendicular to both fields.

B. wrong: the velocity must be perpendicular to both fields.

C. wrong: the magnitude must be E/B.

D. correct: for the electron's velocity to remain constant the electric and magnetic forces must cancel (qE = qvB), so v = E/B, directed perpendicular to both E and B.

Question 150 The lady sitting me has an

The lady sitting _____ me has an elegant style.

- A. at
- B. beside ✓ **Correct answer**
- C. about
- D. around

A. wrong: "sitting at me" is not correct.

B. correct: "The lady sitting beside me has an elegant style."

C. wrong: "sitting about me" is not correct.

D. wrong: "sitting around me" is not correct.

151 Sunken-stomata are found in the leaves

Sunken-stomata are found in the leaves of:

- A. Hydrophytes
- B. Xerophytes ✓ **Correct answer**
- C. Mesophytes
- D. Gibberellins

A. wrong: sunken stomata are found in xerophytes.

B. correct: sunken stomata are found in the leaves of xerophytes (desert plants) to reduce water loss by transpiration.

C. wrong: sunken stomata are found in xerophytes.

D. wrong: gibberellins are plant hormones, not plants.

Question 152 Which of the following animals is

Which of the following animals is not endothermic?

- A. Salamander ✓ **Correct answer**
- B. Great white shark
- C. Polar bear
- D. Butterfly

A. correct as one of the two correct options: the salamander is an ectotherm (cold-blooded), so it is not endothermic.

B. wrong: the great white shark is regionally endothermic (it maintains its body temperature above the water temperature).

C. wrong: the polar bear is an endothermic mammal.

D. correct as one of the two correct options: the butterfly is an ectotherm (cold-blooded insect), so it is not endothermic. (PICK-ONE: the printed key gives both A and D — both the

and the butterfly are ectotherms, so both options are correct; A is filed as the answer. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 153 Embryonic mass can generate all of

Embryonic mass can generate all of the following except:

- A. Amnion
- B. Chorion ✓ **Correct answer**
- C. Yolk sac
- D. Allantois

A. wrong as the answer here: the amnion is generated from the embryonic mass.

B. correct: the embryonic mass (inner cell mass) can generate the amnion, yolk sac and allantois, but the chorion develops from the trophoblast, not from the embryonic mass.

C. wrong as the answer here: the yolk sac is generated from the embryonic mass.

D. wrong as the answer here: the allantois is generated from the embryonic mass.

Question 154 The aqueous solution of which one

The aqueous solution of which one of the following compounds maintain its pH constant?

- A. CH_3COOH and $(NH_4)_2SO_4$
- B. NH_4NO_3 and KNO_3
- C. NH_4OH and NH_4Cl ✓ **Correct answer**
- D. NH_4OH and NaCl

A. wrong: this mixture does not maintain a constant pH.

B. wrong: this mixture does not maintain a constant pH.

C. correct: ammonium hydroxide and ammonium chloride form a basic buffer solution,

ains its pH constant.

D. wrong: this mixture does not maintain a constant pH.

Question 155 electronic transition occurs in molecules that

π – π* electronic transition occurs in molecules that having

- A. Double bond
- B. Triple bond
- C. Aromatic ring
- D. All of the above ✓ **Correct answer**

A. wrong as the answer here: π–π* transitions occur in molecules with double bonds, triple bonds and aromatic rings.

B. wrong as the answer here: π–π* transitions occur in molecules with double bonds, triple bonds and aromatic rings.

C. wrong as the answer here: π–π* transitions occur in molecules with double bonds, triple bonds and aromatic rings.

D. correct: π–π* electronic transitions occur in molecules having a double bond, a triple bond or an aromatic ring — all contain π bonds.

Question 156 Select alkene of the following hydrocarbons

Select alkene of the following hydrocarbons:

- A. C5H12
- B. C5H10 ✓ **Correct answer**
- C. C5H8
- D. C4H10

A. wrong: C5H12 is an alkane (pentane).

C5H10 fits the alkene formula CnH2n, so it is an alkene (pentene).

C. wrong: C5H8 is an alkyne (pentyne).

D. wrong: C4H10 is an alkane (butane).

Question 157 The wave nature of electrons is

The wave nature of electrons is suggested by experiments on

- A. Line spectra of atoms
- B. the production of x-rays
- C. the photoelectric effect
- D. electrons diffraction by crystalline material ✓ **Correct answer**

A. wrong: line spectra suggest the particle nature of energy levels, not the wave nature of electrons.

B. wrong: X-ray production does not demonstrate the wave nature of electrons.

C. wrong: the photoelectric effect demonstrates the particle nature of light.

D. correct: the wave nature of electrons is suggested by experiments on electron diffraction by crystalline material (Davisson–Germer experiment).

Question 158 The principle of a simple form

The principle of a simple form of mass spectrometer: ions are passed through a narrow slits S1 and S2 and into a velocity selector. The ions after passing through the slit S3 are deviated by uniform magnetic field. The quantities that must remain constant for all ions arriving at photographic plate are:

- A. Charge
- B. Charge / mass (e/m) ✓ **Correct answer**
- C. Kinetic energy
- D. Mass

e quantity that must remain constant is the charge-to-mass ratio.

B. correct: in a mass spectrometer the ions arriving at the photographic plate after the velocity selector and the magnetic deflection have the same charge-to-mass ratio (e/m).

C. wrong: the quantity that must remain constant is the charge-to-mass ratio.

D. wrong: the quantity that must remain constant is the charge-to-mass ratio.

Question 159 The proper time between two events

The proper time between two events, is measured by clock at rest in a reference frame in which the two events

- A. Occurs at the same time
- B. Occurs at the same co-ordinates ✓ **Correct answer**
- C. Are separated by the distance a light signal can travel during the time interval
- D. Satisfy none of the above

A. wrong: proper time is measured when the two events occur at the same coordinates.

B. correct: the proper time between two events is measured by a clock at rest in a reference frame in which the two events occur at the same coordinates.

C. wrong: this is not the definition of proper time.

D. wrong: proper time is measured when the events occur at the same coordinates.

Question 160 He said to me What a

He said to me, “What a stupid fellow you are!” [Indirect form of the sentence is]:

- A. He exclaimed that I was a very stupid fellow. ✓ **Correct answer**
- B. He told me that you were a stupid fellow.
- C. He exclaimed that what a stupid fellow I was.
- D. He did tell me that I had been a stupid fellow.

he said to me, "What a stupid fellow you are!"" becomes "He exclaimed that I was a very stupid fellow."

B. wrong: the pronoun must change to "I" and the exclamation needs "exclaimed".

C. wrong: "what" is not retained in the indirect form.

D. wrong: this is not the correct indirect form.

Question 161 A hormone that prevents senescence in

A hormone that prevents senescence in leaves is:

- A. Abscisic acid
- B. Cytokinins ✓ **Correct answer**
- C. Seismonasty
- D. Demonasty

A. wrong: abscisic acid promotes senescence, it does not prevent it.

B. correct: cytokinins delay (prevent) senescence in leaves.

C. wrong: seismonasty is a movement in response to touch.

D. wrong: this is not a hormone that prevents senescence. (Noted: a second reproduction's key records A, but abscisic acid promotes senescence while cytokinins delay it, so the printed key B stands.)

Question 162 The following elements H N P

The following elements H, N, P and Mg are included in:

- A. Macronutrients ✓ **Correct answer**
- B. Micronutrients
- C. Trace elements
- D. Minor elements

ydrogen, nitrogen, phosphorus and magnesium are all macronutrients (needed in large amounts by plants).

B. wrong: H, N, P and Mg are macronutrients.

C. wrong: H, N, P and Mg are macronutrients.

D. wrong: H, N, P and Mg are macronutrients.

Question 163 The only human disease caused by

The only human disease caused by VIROID is:

- A. Hepatitis A
- B. Hepatitis B
- C. Hepatitis C
- D. Hepatitis D ✓ **Correct answer**

A. wrong: hepatitis A is caused by a virus, not a viroid.

B. wrong: hepatitis B is caused by a virus, not a viroid.

C. wrong: hepatitis C is caused by a virus, not a viroid.

D. correct: hepatitis D is the only human disease caused by a viroid (the hepatitis delta agent).

Question 164 The cathode in lead storage battery

The cathode in lead storage battery is made of:

- A. Lead
- B. Lead oxide ✓ **Correct answer**
- C. Lead hydroxide
- D. None of the above

A. wrong: the cathode of a lead storage battery is lead dioxide (lead oxide).

e cathode in a lead storage battery is made of lead dioxide, PbO2 (lead oxide).

C. wrong: the cathode is lead dioxide, not lead hydroxide.

D. wrong: the cathode is lead oxide.

Question 165 The oxidation state of carbon in

The oxidation state of carbon in Na2C2 is:

- A. +4
- B. +2
- C. –1 ✓ **Correct answer**
- D. –4

A. wrong: the oxidation state of carbon in Na2C2 is −1.

B. wrong: the oxidation state of carbon in Na2C2 is −1.

C. correct: in Na2C2, sodium is +1, so the C2 unit carries −2, giving each carbon an oxidation state of −1.

D. wrong: the oxidation state of carbon in Na2C2 is −1.

Question 166 Choose atom that having spin quantum

Choose atom that having spin quantum number ½

- A. 12C
- B. 15N ✓ **Correct answer**
- C. 16O
- D. 32S

A. wrong: ^{12}C has an even number of nucleons, so its nuclear spin is 0.

B. correct: ^{15}N has an odd mass number, so its nuclear spin quantum number is ½.

^{16}O has an even number of nucleons, so its nuclear spin is 0.

D. wrong: ^{32}S has an even number of nucleons, so its nuclear spin is 0.

Question 167 Which of the following electromagnetic radiation

Which of the following electromagnetic radiation has photons with greatest momentum?

- A. Blue light
- B. Yellow light
- C. X-rays ✓ **Correct answer**
- D. Radio wave

A. wrong: X-rays have a higher frequency and hence greater photon momentum than blue light.

B. wrong: X-rays have a higher frequency and hence greater photon momentum than yellow light.

C. correct: photon momentum is $p = h/\lambda$, so the radiation with the shortest wavelength — X-rays — has photons with the greatest momentum.

D. wrong: radio waves have the longest wavelength and the smallest photon momentum.

Question 168 A LASER beam can be sharply

A LASER beam can be sharply focused because it is:

- A. Highly coherent
- B. Intense
- C. Plane polarized
- D. Highly directional ✓ **Correct answer**

A. wrong as the answer here: coherence is a property of laser light, but sharp focusing follows from its directionality.

tensity is not what allows sharp focusing.

C. wrong: polarisation is not what allows sharp focusing.

D. correct: a laser beam can be sharply focused because it is highly directional (it hardly spreads).

Question 169 Binding energy of nucleus is the

Binding energy of nucleus is the energy that must be supplied to:

- A. Remove nucleons
- B. Remove an α-particle
- C. Remove a β-particle
- D. Separate the nucleus into its constituent nucleons ✓ **Correct answer**

A. wrong as the answer here: binding energy is the energy needed to separate the nucleus into its constituent nucleons.

B. wrong: binding energy is the energy needed to separate the nucleus into its constituent nucleons.

C. wrong: binding energy is the energy needed to separate the nucleus into its constituent nucleons.

D. correct: the binding energy of a nucleus is the energy that must be supplied to separate it completely into its constituent nucleons.

Question 170 There is fish in this pond

There is _____ fish in this pond.

- A. many
- B. much ✓ **Correct answer**
- C. any
- D. more

many" needs a plural verb, but the stem uses "is".

B. correct: "There is much fish in this pond" — "fish" is used as an uncountable noun here, so "much" with the singular verb "is" is correct.

C. wrong: "any" does not fit this affirmative sentence.

D. wrong: "more" does not fit here. (Noted: a second reproduction's key records A, but "many" cannot pair with the singular verb "is", so the printed key B stands.)

Question 171 Which of the following animal is

Which of the following animal is included in deuterostome?

- A. Mytilus
- B. Chaetopterus
- C. Penguin ✓ **Correct answer**
- D. Jelly fish

A. wrong: Mytilus (a mussel) is a protostome mollusc.

B. wrong: Chaetopterus (a polychaete worm) is a protostome.

C. correct: the penguin is a chordate, and chordates are deuterostomes.

D. wrong: the jellyfish is a cnidarian, not a deuterostome.

Question 172 The chloroplast size is about

The chloroplast size is about.

- A. 1-2 µm
- B. 2-4 µm
- C. 4-6 µm ✓ **Correct answer**
- D. 6-8 µm

A. wrong: the chloroplast is about 4–6 µm in size.

C. correct: the chloroplast is about 4–6 µm in size.

D. wrong: the chloroplast is about 4–6 µm in size.

Question 173 Heterospory occur in

Heterospory occur in:

- A. Selaginella ✓ **Correct answer**
- B. Equisetum
- C. Lycopodium
- D. Lepidodendron

A. correct: heterospory (production of two types of spores) occurs in Selaginella.

B. wrong: Equisetum is homosporous.

C. wrong: Lycopodium is homosporous.

D. wrong: heterospory occurs in Selaginella.

Question 174 Select cresol out of the following

Select cresol out of the following benzene derivatives?

- A. 1,2,4-Trihydroxybenzene (benzene ring with three –OH groups)
- B. 1,2-Dihydroxybenzene (benzene ring with two –OH groups)
- C. 1,4-Dihydroxybenzene (benzene ring with two –OH groups)
- D. 2-Methylphenol (benzene ring with one –OH and one –CH3 group) ✓ **Correct answer**

A. wrong: a cresol is a methylphenol — a benzene ring with one –OH and one –CH3 group — not a trihydroxybenzene.

B. wrong: a cresol is a methylphenol, not a dihydroxybenzene.

:cresol is a methylphenol, not a dihydroxybenzene.

D. correct: a cresol is a methylphenol — 2-methylphenol (o-cresol) is a benzene ring with one –OH group and one –CH3 group. (The options are printed as structural diagrams in the source PDF; the structures were read from the PDF's embedded image.)

Question 175 The first ionization energy of an

The first ionization energy of an atom depends on:

- A. Charge on nucleus
- B. Screening effect
- C. Electronic configuration
- D. All of the above ✓ **Correct answer**

A. wrong as the answer here: the first ionisation energy depends on the nuclear charge, the screening effect and the electronic configuration.

B. wrong as the answer here: the first ionisation energy depends on the nuclear charge, the screening effect and the electronic configuration.

C. wrong as the answer here: the first ionisation energy depends on the nuclear charge, the screening effect and the electronic configuration.

D. correct: the first ionisation energy of an atom depends on the charge on the nucleus, the screening effect and the electronic configuration.

Question 176 For principle quantum number n 3

For principle quantum number n = 3 the value of magnetic quantum number will be:

- A. 3
- B. 6
- C. 5 ✓ **Correct answer**
- D. 7

n = 3 the number of magnetic quantum numbers is 5.

B. wrong: for n = 3 the number of magnetic quantum numbers is 5.

C. correct: for n = 3 the maximum l is 2, which has 2l + 1 = 5 magnetic quantum numbers (−2, −1, 0, +1, +2).

D. wrong: for n = 3 the number of magnetic quantum numbers is 5.

Question 177 Fission fragments usually decay by emitting

Fission fragments usually decay by emitting:

- A. α-particles
- B. electrons and neutrons ✓ **Correct answer**
- C. Positron and neutrinos
- D. only neutrons

A. wrong: fission fragments usually decay by β^- emission and neutron emission.

B. correct: fission fragments are neutron-rich and usually decay by emitting electrons (β^- decay) and neutrons.

C. wrong: fission fragments decay by emitting electrons and neutrons.

D. wrong: fission fragments decay by emitting electrons as well as neutrons.

Question 178 Nuclear fusion at the sun is

Nuclear fusion at the sun is increasing its supply of:

- A. Hydrogen
- B. Helium ✓ **Correct answer**
- C. Nucleons
- D. Neutron

A. wrong: fusion consumes hydrogen and increases the supply of helium.

uclear fusion at the Sun converts hydrogen into helium, increasing its supply of helium.

C. wrong: fusion increases the supply of helium.

D. wrong: fusion increases the supply of helium. (Noted: a second reproduction's key records C, but fusion converts hydrogen into helium, so the printed key B stands.)

Question 179 Any baryon is a combination of

Any baryon is a combination of:

- A. Three quarks ✓ **Correct answer**
- B. Two quarks
- C. Two quarks and an anti-quark
- D. One quark and one anti-quark

A. correct: any baryon is a combination of three quarks.

B. wrong: a baryon is a combination of three quarks.

C. wrong: a baryon is a combination of three quarks.

D. wrong: a quark and an antiquark form a meson, not a baryon.

Question 180 Choose the correct sentence

Choose the correct sentence:

- A. As far as I know, he bears a good moral character. ✓ **Correct answer**
- B. So far as I know, he bears a good moral character.
- C. As long as I know, he bears a good moral character.
- D. Not that I know, he bears a good moral character.

A. correct: "As far as I know" is the correct idiom.

B. wrong: "so far as I know" is not the correct idiom here.

s long as I know" is not the correct idiom here.

D. wrong: "not that I know" is not the correct idiom here. (Noted: a second reproduction's key records D, but "As far as I know" is the correct idiom, so the printed key A stands.)

Question 181 The person is over weight if

The person is over weight if the body mass index is between:

- A. 15 to 24.9
- B. 17.5 to 24.9
- C. 18.5 to 24.9
- D. 25 to 29.9 ✓ **Correct answer**

A. wrong: a person is overweight if the BMI is between 25 and 29.9.

B. wrong: a person is overweight if the BMI is between 25 and 29.9.

C. wrong: 18.5 to 24.9 is the normal BMI range.

D. correct: a person is overweight if the body mass index is between 25 and 29.9.

Question 182 The blood flow in milliliters minute

The blood flow in milliliters / minute during exercise to the skin is:

- A. 1500 ml
- B. 1600 ml
- C. 1800 ml
- D. 1900 ml ✓ **Correct answer**

A. wrong: the blood flow to the skin during exercise is 1900 ml/minute.

B. wrong: the blood flow to the skin during exercise is 1900 ml/minute.

C. wrong: the blood flow to the skin during exercise is 1900 ml/minute.

...e blood flow to the skin during exercise is 1900 ml/minute.

Question 183 The number of Hydrogen bonds between

The number of Hydrogen bonds between guanine and cytosine are:

- A. One
- B. Two
- C. Three ✓ **Correct answer**
- D. Four

A. wrong: there are three hydrogen bonds between guanine and cytosine.

B. wrong: two hydrogen bonds occur between adenine and thymine.

C. correct: there are three hydrogen bonds between guanine and cytosine.

D. wrong: there are three hydrogen bonds between guanine and cytosine.

Question 184 Chromium compounds in which oxidation state

Chromium compounds in which oxidation state is 6+ behaves as:

- A. Strong oxidizing agent ✓ **Correct answer**
- B. Strong reducing agent
- C. Very weak oxidizing agent
- D. Very weak reducing agent

A. correct: chromium compounds in the +6 oxidation state (e.g. K2Cr2O7) behave as strong oxidising agents.

B. wrong: Cr(VI) compounds are strong oxidising agents.

C. wrong: Cr(VI) compounds are strong oxidising agents.

D. wrong: Cr(VI) compounds are strong oxidising agents.

185 Choose the correct reaction

Choose the correct reaction:

- A. PbO + 4NaOH → Pb(OH)4 + 2Na2O
- B. PbO + 2NaOH + H2O → Na2[Pb(OH)4] ✓ **Correct answer**
- C. PbO + NaOH + H2O → Na[Pb(OH)3]
- D. PbO + 4NaOH + H2O → Na4[Pb(OH)6]

A. wrong: this equation is not balanced.

B. correct: lead(II) oxide reacts with sodium hydroxide and water to give sodium tetrahydroxoplumbate(II), Na2[Pb(OH)4].

C. wrong: the correct product is Na2[Pb(OH)4].

D. wrong: the correct product is Na2[Pb(OH)4].

Question 186 The frequency of green light is

The frequency of green light is 6 × 10^14 Hz. Its wave length is:

- A. 50 nm
- B. 500 nm ✓ **Correct answer**
- C. 5000 nm
- D. 100 nm

A. wrong: the wavelength is 500 nm.

B. correct: $\lambda = c/f = 3 \times 10^8 / 6 \times 10^{14} = 5 \times 10^{-7}$ m = 500 nm.

C. wrong: the wavelength is 500 nm.

D. wrong: the wavelength is 500 nm.

187 One end of cylindrical pipe has

One end of cylindrical pipe has a radius of 1.5 cm, water stream (density = 1.0 × 10^3 kg/m3) steadily out at 7.0 m/s, the volume rate is:

- A. 4.9 × 10-3 m3/s ✓ **Correct answer**
- B. 4.9 m3/s
- C. 7.0 m3/s
- D. 49 m3/s

A. correct: the volume rate is $A \cdot v = \pi(0.015\ \text{m})^2 \times 7.0\ \text{m/s} \approx 4.9 \times 10^{-3}\ \text{m}^3/\text{s}$.

B. wrong: the volume rate is $4.9 \times 10^{-3}\ \text{m}^3/\text{s}$.

C. wrong: the volume rate is $4.9 \times 10^{-3}\ \text{m}^3/\text{s}$.

D. wrong: the volume rate is $4.9 \times 10^{-3}\ \text{m}^3/\text{s}$.

Question 188 An Incompressible liquid flow along the

An Incompressible liquid flow along the pipe with area of cross section A1 and A2 with velocities V1 and V2 respectively. The ratio of the speeds V1 / V2 is:

- A. A1 / A2
- B. A2 / A1 ✓ **Correct answer**
- C. √(A1 / A2)
- D. √(A2 / A1)

A. wrong: by the equation of continuity V1/V2 = A2/A1.

B. correct: by the equation of continuity A1V1 = A2V2, so V1/V2 = A2/A1.

C. wrong: by the equation of continuity V1/V2 = A2/A1.

D. wrong: by the equation of continuity V1/V2 = A2/A1.

189 Water flows through a constriction in

Water flows through a constriction in horizontal pipe as it enters the constriction, the water's

- A. Speed increases and pressure remains constant
- B. Speed increases and pressure increase
- C. Speed increases and pressure decreases ✓ **Correct answer**
- D. Speed decreases and pressure increases

A. wrong: as the water enters the constriction its speed increases and its pressure decreases.

B. wrong: the pressure decreases.

C. correct: by Bernoulli's principle, as water enters a constriction its speed increases and its pressure decreases.

D. wrong: the speed increases and the pressure decreases.

Question 190 Will you give me your bicycle

Will you give me your bicycle? [Passive form of the sentence is:]

- A. Will your bicycle be given to me by you? ✓ **Correct answer**
- B. Shall you be given to me by your bicycle?
- C. I shall be given your bicycle by you?
- D. Your bicycle will be given to me by you?

A. correct: the passive of "Will you give me your bicycle?" is "Will your bicycle be given to me by you?"

B. wrong: this is not the correct passive form.

C. wrong: this changes the tense and the subject.

D. wrong: the passive must keep the interrogative "will" at the start.

191 The optimum pH of enzyme maltase

The optimum pH of enzyme maltase is:

- A. 4.5
- B. 5.5
- C. 6.1 – 6.8 ✓ **Correct answer**
- D. 6.7 – 7

A. wrong: the optimum pH of maltase is 6.1–6.8.

B. wrong: the optimum pH of maltase is 6.1–6.8.

C. correct: the optimum pH of the enzyme maltase is 6.1–6.8.

D. wrong: the optimum pH of maltase is 6.1–6.8.

Question 192 Mature ovum in human beings is

Mature ovum in human beings is surrounded by:

- A. Plasma membrane
- B. Vitelline membrane
- C. Corona radiate
- D. All of the above ✓ **Correct answer**

A. wrong as the answer here: the mature ovum is surrounded by the plasma membrane, the vitelline membrane and the corona radiata.

B. wrong as the answer here: the mature ovum is surrounded by the plasma membrane, the vitelline membrane and the corona radiata.

C. wrong as the answer here: the mature ovum is surrounded by the plasma membrane, the vitelline membrane and the corona radiata.

D. correct: the mature ovum in human beings is surrounded by the plasma membrane, the vitelline membrane and the corona radiata.

193 In mitochondria UGA Codon act to

In mitochondria UGA Codon act to specify

- A. Arginine
- B. Glutamine
- C. Tryptophan ✓ **Correct answer**
- D. Valine

A. wrong: in mitochondria the UGA codon specifies tryptophan.

B. wrong: in mitochondria the UGA codon specifies tryptophan.

C. correct: in mitochondria the UGA codon (a stop codon in the universal code) specifies tryptophan.

D. wrong: in mitochondria the UGA codon specifies tryptophan.

Question 194 When an electron drop from any

When an electron drop from any higher orbit i.e. n2 ≥ 3 to the second orbit n1 = 2, the spectral lines produced fall in the region:

- A. Visible ✓ **Correct answer**
- B. Ultraviolet
- C. Infrared
- D. None of the above

A. correct: transitions from n ≥ 3 to n = 2 form the Balmer series, whose lines fall in the visible region.

B. wrong: transitions to n = 2 fall in the visible region (the Lyman series, to n = 1, is ultraviolet).

C. wrong: transitions to n = 2 fall in the visible region (the Paschen series, to n = 3, is infrared).

ansitions to n = 2 fall in the visible region.

Question 195 Select the correct formula of chloropenta-aqua-chromium

Select the correct formula of chloropenta-aqua-chromium (III) chloride.

- A. $[Cr(H_2O)_5Cl]Cl_3$
- B. $[Cr(H_2O)_5Cl]Cl_2$ ✓ **Correct answer**
- C. $[Cr(H_2O)_5Cl_2]Cl$
- D. $[Cr(H_2O)_5Cl_3]Cl$

A. wrong: the complex ion $[Cr(H_2O)_5Cl]^{2+}$ needs two chloride counter-ions.

B. correct: chloropenta-aqua-chromium(III) chloride is $[Cr(H_2O)_5Cl]Cl_2$ — the complex cation is $[Cr(H_2O)_5Cl]^{2+}$, balanced by two Cl^- ions.

C. wrong: only one chloride is coordinated in this compound.

D. wrong: only one chloride is coordinated in this compound.

Question 196 The components of bronze alloy are

The components of bronze alloy are:

- A. Copper and zinc
- B. Copper and tin ✓ **Correct answer**
- C. Zinc and tin
- D. Chromium and Tin

A. wrong: copper and zinc form brass.

B. correct: bronze is an alloy of copper and tin.

C. wrong: bronze is an alloy of copper and tin.

onze is an alloy of copper and tin.

Question 197 A larger water tank open at

A larger water tank open at the top has small hole in the bottom when the water level is 30 m above the bottom of the tank the speed of the water leaking from the hole is:

- A. 2.5 m/s
- B. 24 m/s ✓ **Correct answer**
- C. 44 m/s
- D. Cannot be calculated unless the area of the hole is given

A. wrong: the speed is about 24 m/s.

B. correct: by Torricelli's theorem $v = \sqrt{(2gh)} = \sqrt{(2 \times 9.8 \times 30)} \approx 24$ m/s.

C. wrong: the speed is about 24 m/s.

D. wrong: Torricelli's theorem gives the speed from the height alone.

Question 198 A60-kg block is released from rest

A6.0-kg block is released from rest 80 m above the ground. When it has fallen 60 m its kinetic energy is approximately:

- A. 4800 J
- B. 3500 J ✓ **Correct answer**
- C. 1200 J
- D. 120 J

A. wrong: the kinetic energy after falling 60 m is about 3500 J.

B. correct: the kinetic energy gained equals the potential energy lost, $mgh = 6 \times 10 \times 60 = 3600$ J ≈ 3500 J.

C. wrong: the kinetic energy after falling 60 m is about 3500 J.

e kinetic energy after falling 60 m is about 3500 J.

Question 199 A science museum designs an experiment

A science museum designs an experiment to show the fall of a feather in a vertical glass vacuum tube. The time of fall from test is too close to 0.5 s. What length of tube is required?

- A. 1.3 m ✓ **Correct answer**
- B. 2.5 m
- C. 5.0 m
- D. 10.0 m

A. correct: the distance fallen in 0.5 s is $s = \frac{1}{2}gt^2 = \frac{1}{2} \times 9.8 \times (0.5)^2 \approx 1.2–1.3$ m, so a tube about 1.3 m long is required.

B. wrong: the distance fallen in 0.5 s is about 1.3 m.

C. wrong: the distance fallen in 0.5 s is about 1.3 m.

D. wrong: the distance fallen in 0.5 s is about 1.3 m.

Question 200 Frown on somebody means to

‘Frown on somebody’ means to:

- A. Fall flat upon a stranger
- B. Stay alive working hard
- C. Unable to be successful
- D. Disapprove of somebody ✓ **Correct answer**

A. wrong: "frown on somebody" means to disapprove of somebody.

B. wrong: "frown on somebody" means to disapprove of somebody.

C. wrong: "frown on somebody" means to disapprove of somebody.

o frown on somebody" means to disapprove of somebody.

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