MDCAT (ETEA entry test, Paper MDCAT-1) — 2014 · Solved Past Paper

Body: Educational Testing and Evaluation Agency (ETEA) · **Post:** MDCAT (ETEA entry test, Paper MDCAT-1) · **Year:** 2014 · **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 2014 sitting.

Source note: Question stems and options: ETEA MDCAT 2014, Paper MDCAT-1 (educationinkarachi.net/wp-content/uploads/2026/09/ETEA-MDCAT-2014.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 Sunday 17 August 2014 (booknstuff.com schedule page: test date 17 August 2014, result 18 August 2014; biseresult.pk: KMU MBBS/BDS Entrance Test 2014 on 17 August). Printed key letter counts A50 / B49 / C51 / D48 (single-letter entries) plus 2 dual-letter entries (Q36 A/B, Q110 C/D). Subjects Biology/Chemistry/Physics/English interleaved across Q1-Q200 (no subject sections in the printed paper). 2 PICK-ONE (Q36, Q110) and 0 DEFECTIVE-excluded. Q96 options filed as x 100 (source prints x 100; the extraction reads x 10^0). Answers verified independently against reference facts, worked derivations and targeted sources, never from the printed key alone. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

Question 1 A current of 200A flows through

A current of 20.0A flows through a battery with an emf of 6.20 V. If the internal resistance of the battery is 0.01Ω, what is the terminal voltage?

- B. 31.0V
- C. 1.24V
- D. 6.00V ✓ **Correct answer**

A. wrong: the terminal voltage is E − Ir = 6.20 − 0.20 = 6.00 V.

B. wrong: the terminal voltage is 6.00 V.

C. wrong: the terminal voltage is 6.00 V.

D. correct: the terminal voltage is V = E − Ir = 6.20 − (20.0 × 0.01) = 6.20 − 0.20 = 6.00 V.

Question 2 Both DNA and RNA are synthesized

Both DNA and RNA are synthesized by the process of:

- A. Transcription
- B. Replication
- C. Polymerization ✓ **Correct answer**
- D. PCR

A. wrong: transcription synthesizes RNA only.

B. wrong: replication synthesizes DNA only.

C. correct: both DNA and RNA are synthesized by polymerization (joining nucleotides into a polymer chain).

D. wrong: PCR is a laboratory technique for amplifying DNA, not the process that synthesizes both DNA and RNA.

Question 3 The cross between two dissimilar individuals

The cross between two dissimilar individuals is called:

- A. Test cross

- C. Epistasis
- D. Hybridization ✓ **Correct answer**

A. wrong: a test cross is a cross with a recessive homozygote to find the genotype.

B. wrong: interbreeding is mating within the same breed or variety.

C. wrong: epistasis is the interaction of genes at different loci.

D. correct: the cross between two dissimilar individuals is called hybridization.

Question 4 CHUCKLE means

'CHUCKLE' means:

- A. Bouquet of flowers
- B. displeasing manner
- C. suppressed laughter ✓ **Correct answer**
- D. religious movement

A. wrong: "chuckle" does not mean a bouquet of flowers.

B. wrong: "chuckle" does not mean a displeasing manner.

C. correct: "chuckle" means suppressed (quiet) laughter.

D. wrong: "chuckle" does not mean a religious movement.

Question 5 Cell-wall of gram positive bacteria is

Cell-wall of gram positive bacteria is composed of:

- A. Glycolipids
- B. Glycoproteins
- C. Lipoproteins
- D. Peptidoglycan ✓ **Correct answer**

e gram-positive cell wall is composed of peptidoglycan.

B. wrong: the gram-positive cell wall is composed of peptidoglycan.

C. wrong: the gram-positive cell wall is composed of peptidoglycan.

D. correct: the cell wall of gram-positive bacteria is composed mainly of peptidoglycan (murein).

Question 6 Shade loving plants are called

Shade loving plants are called:

- A. Halophytes
- B. Mesophytes
- C. Sciophytes ✓ **Correct answer**
- D. Xerophytes

A. wrong: halophytes are salt-loving plants.

B. wrong: mesophytes grow in moderate conditions.

C. correct: shade-loving plants are called sciophytes.

D. wrong: xerophytes are dry-habitat plants.

Question 7 Which of the following is a

Which of the following is a Lewis acid?

- A. CH_3OH
- B. $AlCl_3$ ✓ **Correct answer**
- C. NH_3
- D. CH_3OCH_3

A. wrong: methanol is a Lewis base (electron-pair donor).

aluminium chloride is a Lewis acid — it accepts an electron pair (it has an incomplete octet).

C. wrong: ammonia is a Lewis base.

D. wrong: dimethyl ether is a Lewis base.

Question 8 Ethanol CH3CH2OH and dimethyl ether CH3OCH3

Ethanol (CH3CH2OH) and dimethyl ether (CH3OCH3) are the best considered as:

- A. Structural isomers ✓ **Correct answer**
- B. Stereo isomers
- C. Enantiomers
- D. Diastereomers

A. correct: ethanol (CH3CH2OH) and dimethyl ether (CH3OCH3) have the same molecular formula (C2H6O) but different connectivity, so they are structural isomers.

B. wrong: they differ in connectivity, not in spatial arrangement.

C. wrong: they are not mirror images.

D. wrong: they are not stereoisomers.

Question 9 A tertiary carbon is bonded directly

A tertiary carbon is bonded directly to:

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

A. wrong: a tertiary carbon is bonded to three carbons.

B. wrong: a tertiary carbon is bonded to three carbons.

tertiary carbon is bonded directly to three other carbon atoms (and one hydrogen).

D. wrong: a carbon bonded to four carbons is quaternary.

Question 10 Which derived unit below is equivalent

Which derived unit below is equivalent to the SI unit for magnetic field strength, the tesla, T?

- A. Nm/A
- B. NA/m
- C. N/Am ✓ **Correct answer**
- D. Am/N

A. wrong: the tesla is N/(A·m).

B. wrong: the tesla is N/(A·m).

C. correct: the tesla (T) is equivalent to N/(A·m) — from F = BIl, B = F/(Il).

D. wrong: this is the reciprocal of the tesla.

Question 11 A certain radionuclide decays by emitting

A certain radionuclide decays by emitting an α-particle. What is the difference between the atomic numbers of the parent and the daughter nuclides?

- A. 1
- B. 2 ✓ **Correct answer**
- C. 4
- D. 6

A. wrong: an α-particle carries away 2 protons, so the atomic number falls by 2.

B. correct: in α-decay the atomic number of the daughter is 2 less than that of the parent

e has charge +2).

C. wrong: 4 is the fall in the mass number, not the atomic number.

D. wrong: the atomic number falls by 2.

Question 12 A wire of resistance 30 is

A wire of resistance 3.0 Ω is stretched to twice its original length. The resistance of new wire will be:

- A. 1.5 Ω
- B. 3.0 Ω
- C. 6.0 Ω
- D. 12.0 Ω ✓ **Correct answer**

A. wrong: stretching doubles the length and halves the area, so the resistance quadruples to 12 Ω.

B. wrong: the resistance increases to 12 Ω.

C. wrong: the resistance increases to 12 Ω ($R \propto L^2$ when the volume is constant).

D. correct: on stretching to twice the length, $R = \rho L/A$ with the volume constant gives $R \propto L^2$, so the resistance becomes $4 \times 3.0 = 12.0$ Ω.

Question 13 Any DNA molecule having foreign DNA

Any DNA molecule having foreign DNA is called:

- A. Mutant
- B. Recombinant ✓ **Correct answer**
- C. Crossing over
- D. All of the above

A. wrong: a mutant is an organism with an altered gene.

...y DNA molecule having foreign DNA is called recombinant DNA.

C. wrong: crossing over is the exchange of segments between homologous chromosomes.

D. wrong: only recombinant DNA fits the description.

Question 14 The theory of uniformitarianism was proposed

The theory of uniformitarianism was proposed by:

- A. Hutton and Lyell ✓ **Correct answer**
- B. Lamarck
- C. George Cuvier
- D. Darwin

A. correct: the theory of uniformitarianism was proposed by James Hutton and developed by Charles Lyell.

B. wrong: Lamarck proposed the theory of acquired characters.

C. wrong: Cuvier proposed catastrophism.

D. wrong: Darwin proposed natural selection.

Question 15 Money Grubbing implies

'Money Grubbing' implies:

- A. Money saving
- B. Money making
- C. Money hunting ✓ **Correct answer**
- D. Money spending

A. wrong: "money grubbing" means greedily hunting for money.

B. wrong: "money grubbing" means greedily hunting for money.

"money grubbing" implies greedily hunting for (pursuing) money.

D. wrong: "money grubbing" means greedily hunting for money.

Question 16 Photophosphorylation is

"Photophosphorylation" is:

- A. ATP synthesis by food energy.
- B. ATP synthesis by solar energy. ✓ **Correct answer**
- C. ATP synthesis by source of water.
- D. ATP synthesis by source of NADH2

A. wrong: photophosphorylation uses solar energy, not food energy.

B. correct: photophosphorylation is ATP synthesis by solar (light) energy during photosynthesis.

C. wrong: water is the electron donor, not the energy source.

D. wrong: NADH2 is not the energy source for photophosphorylation.

Question 17 Light absorbing pigments in photosystem first

Light absorbing pigments in photosystem first is:

- A. P 600
- B. P 680
- C. P 700 ✓ **Correct answer**
- D. P 760

A. wrong: the light-absorbing pigment of photosystem I is P700.

B. wrong: P680 is the pigment of photosystem II.

C. correct: the light-absorbing pigment in photosystem I is P700 (it absorbs at 700 nm).

e light-absorbing pigment of photosystem I is P700.

Question 18 When acetylene is passed through hot

When acetylene is passed through hot iron tube at 400°C, it gives:

- A. Benzene ✓ **Correct answer**
- B. Toluene
- C. O-Xylene
- D. Metaxylene

A. correct: when acetylene is passed through a hot iron tube at 400 °C, three molecules polymerise (trimerise) to give benzene.

B. wrong: acetylene trimerisation gives benzene, not toluene.

C. wrong: acetylene trimerisation gives benzene, not o-xylene.

D. wrong: acetylene trimerisation gives benzene, not m-xylene.

Question 19 Which of the following compounds will

Which of the following compounds will react with methyl magnesium iodide followed by acid hydrolysis to give ethyl alcohol?

- A. Ethylene
- B. Acetone
- C. Acetaldehyde
- D. Formaldehyde ✓ **Correct answer**

A. wrong: ethylene does not react with a Grignard reagent to give ethyl alcohol.

B. wrong: acetone with CH_3MgI gives tert-butyl alcohol, not ethyl alcohol.

C. wrong: acetaldehyde with CH_3MgI gives isopropyl alcohol, not ethyl alcohol.

D. correct: formaldehyde reacts with methyl magnesium iodide (CH_3MgI) and, after acid

ives ethyl alcohol (CH_3CH_2OH).

Question 20 Diethyl ether and Methyl propyl ether

Diethyl ether and Methyl propyl ether are:

- A. Conformational isomers
- B. Metamers ✓ **Correct answer**
- C. Geometrical isomers
- D. Enantiomers

A. wrong: diethyl ether and methyl propyl ether differ in the alkyl groups on the oxygen, not in conformation.

B. correct: diethyl ether and methyl propyl ether are metamers — isomers differing in the distribution of carbon atoms on either side of the functional group.

C. wrong: ethers do not show geometrical isomerism.

D. wrong: they are not mirror images.

Question 21 A wire of resistance 4 is

A wire of resistance 4Ω is bent into a circle. The resistance between the ends of a diameter of the circle is:

- A. 4Ω
- B. 1 Ω ✓ **Correct answer**
- C. 1/4 Ω
- D. 1/16 Ω

A. wrong: the resistance between the ends of a diameter is 1 Ω.

B. correct: bending the 4 Ω wire into a circle gives two 2 Ω halves between the ends of a diameter; in parallel they give $(2 \times 2)/(2 + 2) = 1$ Ω.

e resistance between the ends of a diameter is 1 Ω.

D. wrong: the resistance between the ends of a diameter is 1 Ω.

Question 22 The state of thermal equilibrium between

The state of thermal equilibrium between two systems is determined by equality of:

- A. pressure
- B. Volume
- C. Temperature ✓ **Correct answer**
- D. Mass

A. wrong: thermal equilibrium is determined by equality of temperature.

B. wrong: thermal equilibrium is determined by equality of temperature.

C. correct: the state of thermal equilibrium between two systems is determined by equality of temperature (zeroth law of thermodynamics).

D. wrong: thermal equilibrium is determined by equality of temperature.

Question 23 In the direction indicated by an

In the direction indicated by an electric field line:

- A. The potential must increase
- B. The potential must decrease ✓ **Correct answer**
- C. The electric field strength must increase
- D. The electric field strength must decrease

A. wrong: the potential decreases along a field line.

B. correct: in the direction of an electric field line the electric potential must decrease ($E = -dV/dr$).

C. wrong: the field strength need not increase along a field line.

e field strength need not decrease along a field line.

Question 24 The enlarged lining epithelium cells connected

The enlarged lining epithelium cells connected with groups of developing spermatozoa in testes is:

- A. Somatic cells
- B. Sertoli cells ✓ **Correct answer**
- C. Stem cells
- D. Totipotent cells

A. wrong: the cells described are Sertoli cells.

B. correct: Sertoli cells are the enlarged lining epithelium cells in the seminiferous tubules connected with groups of developing spermatozoa.

C. wrong: the cells described are Sertoli cells.

D. wrong: the cells described are Sertoli cells.

Question 25 The hormone released by the posterior

The hormone released by the posterior pituitary, that stimulates the contraction of uterine and mammary gland muscles is called:

- A. Prolactin
- B. LH
- C. FSH
- D. Oxytocin ✓ **Correct answer**

A. wrong: prolactin stimulates milk production, not contraction.

B. wrong: LH stimulates ovulation and the corpus luteum.

C. wrong: FSH stimulates follicle development.

oxytocin, released by the posterior pituitary, stimulates contraction of the uterine and mammary gland muscles.

Question 26 Get into a soup implies

'Get into a soup' implies:

- A. Face a predicament ✓ **Correct answer**
- B. play a game of cards
- C. Swallow a fly in soup
- D. go for hot spicy soup

A. correct: "to get into a soup" means to face a predicament (to get into trouble).

B. wrong: "to get into a soup" does not mean playing cards.

C. wrong: "to get into a soup" does not mean swallowing a fly.

D. wrong: "to get into a soup" does not mean going for soup.

Question 27 A study of communities in relation

A study of communities in relation to environment is called:

- A. Social ecology
- B. Synecology ✓ **Correct answer**
- C. Autoecology
- D. Heteroecology

A. wrong: synecology is the study of communities in relation to their environment.

B. correct: the study of communities in relation to their environment is called synecology.

C. wrong: autoecology is the study of a single species in relation to its environment.

D. wrong: there is no such branch called heteroecology.

28 In Eukaryotes DNA replication proceeds at

In Eukaryotes, DNA replication proceeds at the rate of:

- A. 50 base pairs per second ✓ **Correct answer**
- B. 40 base pairs per second
- C. 20 base pairs per second
- D. 30 base pairs per second

A. correct: in eukaryotes DNA replication proceeds at the rate of about 50 base pairs per second.

B. wrong: the eukaryotic rate is about 50 base pairs per second.

C. wrong: the eukaryotic rate is about 50 base pairs per second.

D. wrong: the eukaryotic rate is about 50 base pairs per second.

Question 29 Fatty acids are

Fatty acids are:

- A. Unsaturated dicarboxylic acid
- B. Long chain alkanoic acid ✓ **Correct answer**
- C. Aromatic carboxylic acid
- D. Aromatic dicarboxylic acid

A. wrong: fatty acids are long-chain alkanoic acids.

B. correct: fatty acids are long-chain alkanoic (monocarboxylic) acids.

C. wrong: fatty acids are aliphatic, not aromatic.

D. wrong: fatty acids are aliphatic monocarboxylic acids.

30 Saponification of a fat

Saponification of a fat:

- A. Always results in the formation of soaps.
- B. Results in the formation of esters.
- C. Results in the formation of waxes.
- D. Results in the formation of glycerol and soap. ✓ **Correct answer**

A. wrong as the answer here: saponification of a fat gives glycerol as well as soap.

B. wrong: saponification breaks esters, it does not form them.

C. wrong: saponification does not form waxes.

D. correct: saponification (alkaline hydrolysis) of a fat gives glycerol and soap.

Question 31 Carbylamine test is given by

Carbylamine test is given by:

- A. Primary amines ✓ **Correct answer**
- B. Secondary amines
- C. Tertiary amines
- D. All of these

A. correct: the carbylamine test (isocyanide test) is given by primary amines.

B. wrong: secondary amines do not give the carbylamine test.

C. wrong: tertiary amines do not give the carbylamine test.

D. wrong: only primary amines give the carbylamine test.

Question 32 Of the following one particle belongs

Of the following one particle belongs to lepton group:

- A. Neutrinos ✓ **Correct answer**
- B. Protons
- C. Neutrons
- D. Mesons

A. correct: neutrinos belong to the lepton group (they are elementary particles with half-integer spin that do not take part in the strong interaction).

B. wrong: protons are baryons (hadrons), not leptons.

C. wrong: neutrons are baryons (hadrons), not leptons.

D. wrong: mesons are hadrons, not leptons.

Question 33 Which of the following physical phenomena

Which of the following physical phenomena cannot be described only by the wave theory of the electromagnetic radiation?

- A. Diffractions
- B. Interference
- C. Photoelectric effect ✓ **Correct answer**
- D. Polarization

A. wrong as the answer here: diffraction is described by the wave theory.

B. wrong as the answer here: interference is described by the wave theory.

C. correct: the photoelectric effect cannot be described by the wave theory alone — it needs the particle (photon) theory.

D. wrong as the answer here: polarisation is described by the wave theory.

Question 34 Which of the following is the

Which of the following is the same unit as the farad?

- B. Ωs-1
- C. Ω-1s ✓ **Correct answer**
- D. Ω-1 s-1

A. wrong: the farad is Ω^{-1}s.

B. wrong: the farad is Ω^{-1}s.

C. correct: the farad is the same unit as Ω^{-1}s (from C = Q/V and V = IR, F = A·s/(Ω·A) = s/Ω).

D. wrong: the farad is Ω^{-1}s.

Question 35 A complex form of learning that

A complex form of learning that requires the manipulation of mental concepts to arrive at adaptive behavior is:

- A. Imprinting
- B. Insight learning ✓ **Correct answer**
- C. Latent learning
- D. Trial & error learning

A. wrong: imprinting is a fixed early learning, not the manipulation of mental concepts.

B. correct: insight learning is a complex form of learning that requires the manipulation of mental concepts to arrive at adaptive behaviour.

C. wrong: latent learning is learning without an immediate reward.

D. wrong: trial-and-error learning does not require the manipulation of mental concepts.

Question 36 Which of the following is enzyme

Which of the following is enzyme lacking disease?

- A. PKU ✓ **Correct answer**

- C. Anuria
- D. Diuria

A. correct as one of the two correct options: phenylketonuria (PKU) is an enzyme-lacking disease — the enzyme phenylalanine hydroxylase is missing.

B. correct as one of the two correct options: alkaptonuria is also an enzyme-lacking disease — the enzyme homogentisate oxidase is missing.

C. wrong: anuria is the absence of urine formation, not an enzyme-lacking disease.

D. wrong: diuria is not an enzyme-lacking disease. (PICK-ONE: the printed key gives both A and B — both PKU and alkaptonuria are enzyme-lacking diseases, so both options are correct; A is filed as the answer. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 37 I eagerly look forward seeing you

I eagerly look forward _____ seeing you again.

- A. at
- B. to ✓ **Correct answer**
- C. on
- D. by

A. wrong: "look forward at" is not correct.

B. correct: "I eagerly look forward to seeing you again."

C. wrong: "look forward on" is not correct.

D. wrong: "look forward by" is not correct.

38 Acetic acid reacts with methyl alcohol

Acetic acid reacts with methyl alcohol in the presence of acid catalyst to give:

- A. Ethyl formate
- B. Ethyl acetate
- C. Methyl formate
- D. Methyl acetate ✓ **Correct answer**

A. wrong: acetic acid + methyl alcohol gives methyl acetate.

B. wrong: acetic acid + methyl alcohol gives methyl acetate.

C. wrong: acetic acid + methyl alcohol gives methyl acetate.

D. correct: acetic acid reacts with methyl alcohol (esterification) to give methyl acetate (CH_3COOCH_3).

Question 39 The characteristic reaction of carboxylic acid

The characteristic reaction of carboxylic acid is:

- A. Electrophilic substitutions
- B. Nucleophilic substitution ✓ **Correct answer**
- C. Electrophilic addition
- D. Nucleophilic addition

A. wrong: the characteristic reaction of carboxylic acids is nucleophilic substitution.

B. correct: the characteristic reaction of carboxylic acids is nucleophilic substitution (at the carbonyl carbon, e.g. forming esters, amides and acid chlorides).

C. wrong: the characteristic reaction of carboxylic acids is nucleophilic substitution.

D. wrong: the characteristic reaction of carboxylic acids is nucleophilic substitution.

40 Which of the following compounds does

Which of the following compounds does not give iodoform test on reaction with I2 and NaOH?

- A. Propanone
- B. Methanol ✓ **Correct answer**
- C. Butanone
- D. 2-Propanol

A. wrong as the answer here: propanone (a methyl ketone) gives the iodoform test.

B. correct: methanol does not give the iodoform test (it has no CH3–CO– or CH3–CHOH– group).

C. wrong as the answer here: butanone (a methyl ketone) gives the iodoform test.

D. wrong as the answer here: 2-propanol is oxidised to propanone and gives the iodoform test.

Question 41 The gravitational field strength on the

The gravitational field strength on the surface of the Earth is g. The gravitational field strength on the surface of a planet of twice the radius and the same density is:

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

A. wrong: the field strength is 2g.

B. correct: $g = GM/R^2$ and $M \propto \rho R^3$, so $g \propto \rho R$; with twice the radius and the same density the field strength is 2g.

C. wrong: the field strength is 2g.

e field strength is 2g.

Question 42 Which experimental technique reduces the systematic

Which experimental technique reduces the systematic error of the quantity being investigated?

- A. Adjusting an ammeter to remove its zero error before measuring a current ✓ **Correct answer**
- B. Measuring several internodal distance on a standing wave to find the mean internodal distance.
- C. Measuring the diameter of a wire repeatedly and calculating the average.
- D. Timing a large number of oscillations to find a period.

A. correct: a zero error is a systematic error, and adjusting it out reduces the systematic error.

B. wrong: averaging repeated measurements reduces random error, not systematic error.

C. wrong: averaging reduces random error, not systematic error.

D. wrong: timing many oscillations reduces random error, not systematic error.

Question 43 A basketball is thrown upward along

A basketball is thrown upward along a parabolic path. What is the ball's acceleration at its highest point?

- A. 0
- B. 1/2g, horizontally
- C. g, upward
- D. g, downward ✓ **Correct answer**

A. wrong: the acceleration is g downward at every point, including the highest point.

B. wrong: the acceleration is g downward.

D. correct: at its highest point the ball's velocity is momentarily zero horizontally only, but its acceleration is still g downward.

Question 44 Conversion of alternating current to direct

Conversion of alternating current to direct current is called:

- A. amplification
- B. rectification ✓ **Correct answer**
- C. modulation
- D. both B & C

A. wrong: conversion of a.c. to d.c. is rectification.

B. correct: the conversion of alternating current to direct current is called rectification.

C. wrong: modulation is varying a carrier wave with a signal.

D. wrong: conversion of a.c. to d.c. is rectification only.

Question 45 Operational amplifiers can amplify

Operational amplifiers can amplify:

- A. ac only
- B. dc only
- C. both ac and dc ✓ **Correct answer**
- D. None of them

A. wrong as the answer here: operational amplifiers amplify both a.c. and d.c.

B. wrong as the answer here: operational amplifiers amplify both a.c. and d.c.

C. correct: operational amplifiers can amplify both a.c. and d.c. signals.

operational amplifiers amplify both a.c. and d.c.

Question 46 A medical lab has a 16g

A medical lab has a 16g of sample of radioactive isotopes. After 6 hours it was found that 12g of a sample have decayed. The half life of the isotope is:

- A. 12 hours
- B. 6 hours
- C. 2 hours
- D. 3 hours ✓ **Correct answer**

A. wrong: the half-life is 3 hours.

B. wrong: the half-life is 3 hours.

C. wrong: the half-life is 3 hours.

D. correct: 12 g of the 16 g sample decayed, leaving 4 g — one quarter of the original, i.e. two half-lives in 6 hours, so the half-life is 3 hours.

Question 47 You will be the perfect in

You will be the perfect in charge ____ this group.

- A. of ✓ **Correct answer**
- B. to
- C. by
- D. on

A. correct: "You will be the perfect in charge of this group."

B. wrong: "in charge to" is not correct.

C. wrong: "in charge by" is not correct.

D. wrong: "in charge on" is not correct.

48 Which of the following substituents is

Which of the following substituents is an Ortho and Para director and ring deactivating?

- A. –OH
- B. –NH2
- C. –Cl ✓ **Correct answer**
- D. –OCH3

A. wrong: –OH is an ortho/para director but it activates the ring.

B. wrong: –NH2 is an ortho/para director but it activates the ring.

C. correct: the chlorine atom is an ortho and para director and it deactivates the ring (halogens are the exception).

D. wrong: –OCH3 is an ortho/para director but it activates the ring.

Question 49 Which of the following compounds undergoes

Which of the following compounds undergoes nitration most readily?

- A. Benzene
- B. Toluene ✓ **Correct answer**
- C. Benzoic acid
- D. Nitrobenzene

A. wrong: toluene undergoes nitration most readily (the methyl group activates the ring).

B. correct: toluene undergoes nitration most readily — the methyl group is electron-donating and activates the ring towards electrophilic substitution.

C. wrong: the –COOH group deactivates the ring.

D. wrong: the –NO2 group strongly deactivates the ring.

50 Which of the following is not

Which of the following is not ferromagnetic substance:

- A. iron
- B. cobalt
- C. Nickel
- D. Barium ✓ **Correct answer**

A. wrong as the answer here: iron is ferromagnetic.

B. wrong as the answer here: cobalt is ferromagnetic.

C. wrong as the answer here: nickel is ferromagnetic.

D. correct: barium is not a ferromagnetic substance.

Question 51 The sound waves and light waves

The sound waves and light waves cannot be both:

- A. polarized ✓ **Correct answer**
- B. Refracted
- C. Reflected
- D. Diffracted

A. correct: sound waves (longitudinal) cannot be polarized, while light waves (transverse) can — so the two cannot both be polarized.

B. wrong as the answer here: both sound and light waves can be refracted.

C. wrong as the answer here: both sound and light waves can be reflected.

D. wrong as the answer here: both sound and light waves can be diffracted.

Question 52 Diffraction is the name given to

Diffraction is the name given to the:

- A. Addition of two coherent waves to produce a stationary wave pattern.
- B. Bending of waves round an obstacle ✓ **Correct answer**
- C. Change of direction when waves cross the boundary between one medium and another.
- D. Splitting of white light into colours.

A. wrong: that is interference.

B. correct: diffraction is the bending of waves round an obstacle (or through an aperture).

C. wrong: that is refraction.

D. wrong: that is dispersion.

Question 53 Two forces having magnitudes 35N and

Two forces having magnitudes 3.5N and 5.5N are acting on a body. Which one of the following cannot be the resultant of their possible sum?

- A. 1.5 N ✓ **Correct answer**
- B. 2.5 N
- C. 4.5 N
- D. 6.5 N

A. correct: the resultant of 3.5 N and 5.5 N lies between 5.5 − 3.5 = 2.0 N and 5.5 + 3.5 = 9.0 N, so 1.5 N cannot be the resultant.

B. wrong: 2.5 N lies within the possible range 2.0–9.0 N.

C. wrong: 4.5 N lies within the possible range 2.0–9.0 N.

D. wrong: 6.5 N lies within the possible range 2.0–9.0 N.

54 Which of the following play role

Which of the following play role in Biorhythm?

- A. MSH
- B. LH
- C. ADH
- D. Melatonin ✓ **Correct answer**

A. wrong: MSH (melanocyte-stimulating hormone) does not control biorhythm.

B. wrong: LH does not control biorhythm.

C. wrong: ADH (antidiuretic hormone) does not control biorhythm.

D. correct: melatonin (from the pineal gland) plays a role in biorhythm (the sleep–wake cycle).

Question 55 Hypothalamus is a part of

Hypothalamus is a part of:

- A. Diencephalon ✓ **Correct answer**
- B. Myelencephalon
- C. Metencephalon
- D. Telencephalon

A. correct: the hypothalamus is a part of the diencephalon (forebrain).

B. wrong: the myelencephalon is the medulla oblongata.

C. wrong: the metencephalon is the pons and cerebellum.

D. wrong: the telencephalon is the cerebrum.

56 ARABLE means

‘ARABLE’ means:

- A. Not grown since long
- B. Recently ploughed field
- C. watered the night before
- D. Fit for cultivation ✓ **Correct answer**

A. wrong: "arable" means fit for cultivation.

B. wrong: "arable" means fit for cultivation.

C. wrong: "arable" means fit for cultivation.

D. correct: "arable" means fit for cultivation (land suitable for growing crops).

Question 57 Blue green algae besides chlorophyll also

Blue green algae, besides chlorophyll also possess another pigment known as:

- A. phycocyanin ✓ **Correct answer**
- B. phycoerythrin
- C. phycobillirubin
- D. Phycobiliprotein

A. correct: blue-green algae (cyanobacteria), besides chlorophyll, also possess the pigment phycocyanin (which gives them their blue-green colour).

B. wrong: phycoerythrin is the red pigment of red algae.

C. wrong: phycocyanin is the pigment of blue-green algae.

D. wrong: phycocyanin (a phycobiliprotein) is the specific pigment named here.

58 Milk is pasteurized by heating for

Milk is pasteurized by heating for 15 seconds at the temperature of:

- A. 60°C
- B. 71°C ✓ **Correct answer**
- C. 50°C
- D. 80°C

A. wrong: milk is pasteurised at 71 °C for 15 seconds.

B. correct: milk is pasteurised by heating for 15 seconds at 71 °C (HTST pasteurisation).

C. wrong: milk is pasteurised at 71 °C for 15 seconds.

D. wrong: milk is pasteurised at 71 °C for 15 seconds.

Question 59 Which one of the following is

Which one of the following is most ionic?

- A. NaCl
- B. MgCl2
- C. KCl ✓ **Correct answer**
- D. AlCl3

A. wrong as the answer here: KCl is more ionic than NaCl (potassium is more electropositive than sodium).

B. wrong: MgCl2 is less ionic than KCl.

C. correct: KCl is the most ionic — potassium is the most electropositive metal among the options, giving the largest electronegativity difference with chlorine.

D. wrong: AlCl3 has considerable covalent character.

60 The compound used in borax bead

The compound used in borax bead test for the detection of basic radicals to form colored bead is:

- A. H_3BO_3
- B. $(C_2H_5)_3BO_3$
- C. $Ca_2B_6O_{11}\cdot 5H_2O$
- D. $Na_2B_4O_7\cdot 10H_2O$ ✓ **Correct answer**

A. wrong: the borax bead test uses borax, $Na_2B_4O_7\cdot 10H_2O$.

B. wrong: the borax bead test uses borax, $Na_2B_4O_7\cdot 10H_2O$.

C. wrong: this is colemanite, not borax.

D. correct: borax ($Na_2B_4O_7\cdot 10H_2O$) is used in the borax bead test for the detection of basic radicals.

Question 61 Milk of magnesia is used for

Milk of magnesia is used for treatment of acidity in stomach, its formula is:

- A. $Mg(OH)_2$ ✓ **Correct answer**
- B. $MgSO_4$
- C. $Ca(OH)_2$
- D. $CaSO_4$

A. correct: milk of magnesia is magnesium hydroxide, $Mg(OH)_2$, used as an antacid.

B. wrong: $MgSO_4$ is Epsom salt, not milk of magnesia.

C. wrong: $Ca(OH)_2$ is slaked lime, not milk of magnesia.

D. wrong: $CaSO_4$ is gypsum, not milk of magnesia.

62 A battery is marked 90V What

A battery is marked 9.0V. What does this mean?

- A. Each coulomb of charge from the battery supplies 9.0J of electrical energy to the whole circuit. ✓ **Correct answer**
- B. The battery supplies 9.0J to an external circuit for each coulomb of charge.
- C. The potential difference across any component connected to the battery will be 9.0V.
- D. There will always be 9.0V across the battery terminals.

A. correct: a battery marked 9.0 V has an e.m.f. of 9.0 V — each coulomb of charge supplies 9.0 J of electrical energy to the whole circuit (external circuit plus the battery's internal resistance).

B. wrong: the 9.0 J is supplied to the whole circuit, not only to the external circuit.

C. wrong: the p.d. across a component is less than the e.m.f. when current flows.

D. wrong: the terminal p.d. falls below the e.m.f. when current flows.

Question 63 Using monochromatic light interference fringes are

Using monochromatic light, interference fringes are produced on a screen placed a distance D from a pair of slits of separation a. The separation of the fringes is x. Both a and D are now doubled. What is the new fringe separation?

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

A. wrong: the fringe separation stays x.

B. correct: the fringe separation is $x = \lambda D/a$; doubling both a and D leaves x unchanged.

e fringe separation stays x.

D. wrong: the fringe separation stays x.

Question 64 Select the true statement about the

Select the true statement about the amorphous solids:

- A. The amorphous substances have sharp melting point
- B. The amorphous substances do not have fixed melting point ✓ **Correct answer**
- C. The amorphous substances have proper geometrical shapes.
- D. The particles in amorphous substances are arranged in an orderly manner.

A. wrong: amorphous substances do not have a sharp melting point.

B. correct: amorphous solids do not have a fixed (sharp) melting point — they soften over a range of temperatures.

C. wrong: amorphous substances have no proper geometrical shape.

D. wrong: the particles in amorphous substances are arranged randomly.

Question 65 Both NaNO3 and CaCO3 crystallize in

Both NaNO3 and CaCO3 crystallize in Rhombohedral forms therefore they are:

- A. Allotropes
- B. Polymorphous
- C. Isomorphous ✓ **Correct answer**
- D. None of these

A. wrong: allotropes are different forms of the same element.

B. wrong: polymorphous substances are different crystal forms of the same compound.

C. correct: substances that crystallise in the same form (NaNO3 and CaCO3 both rhombohedral) are called isomorphous.

aNO3 and CaCO3 are isomorphous.

Question 66 Pure water freezes at 0C and

Pure water freezes at 0°C and boils at 100°C at standard conditions. Calcium chloride was added to pure water. What do you expect about its freezing point and boiling point?

- A. No change in its freezing point and boiling point
- B. Freezing point increases and boiling point decreases.
- C. Freezing point increases and boiling point increases
- D. Freezing point decreases and boiling point increases ✓ **Correct answer**

A. wrong: adding a solute lowers the freezing point and raises the boiling point.

B. wrong: the freezing point decreases and the boiling point increases.

C. wrong: the freezing point decreases.

D. correct: adding calcium chloride (a non-volatile solute) lowers the freezing point and raises the boiling point of water.

Question 67 The internal energy of a fixed

The internal energy of a fixed mass of an ideal gas depends on:

- A. Pressure but not volume or temperature.
- B. Temperature but not pressure or volume. ✓ **Correct answer**
- C. Volume but not pressure or temperature.
- D. Pressure and temperature but not volume.

A. wrong: the internal energy of an ideal gas depends on temperature only.

B. correct: the internal energy of a fixed mass of an ideal gas depends on temperature only.

C. wrong: the internal energy of an ideal gas depends on temperature only.

e internal energy of an ideal gas depends on temperature only.

Question 68 A spring obeying Hookes law has

A spring obeying Hooke’s law has an unstretched length of 50mm and a spring constant of 400 Nm-1. What is the tension in the spring when its overall length is 70mm?

- A. 8.0N ✓ **Correct answer**
- B. 28N
- C. 160N
- D. 400N

A. correct: the extension is 70 − 50 = 20 mm = 0.02 m, so the tension is F = kx = 400 × 0.02 = 8.0 N.

B. wrong: the tension is 8.0 N.

C. wrong: the tension is 8.0 N.

D. wrong: the tension is 8.0 N.

Question 69 Which thermodynamic temperature is equivalent to

Which thermodynamic temperature is equivalent to 501.85°C?

- A. 775.00 K ✓ **Correct answer**
- B. 774.85 K
- C. 228.85K
- D. 228.70 K

A. correct: 501.85 °C + 273.15 = 775.00 K.

B. wrong: 501.85 °C is 775.00 K.

C. wrong: 501.85 °C is 775.00 K.

D. wrong: 501.85 °C is 775.00 K.

70 Which of the following ions play

Which of the following ions play important role in the transport of carbon dioxide?

- A. Sodium
- B. Potassium
- C. Bicarbonate ✓ **Correct answer**
- D. Chloride

A. wrong: bicarbonate ions play the important role in CO2 transport.

B. wrong: bicarbonate ions play the important role in CO2 transport.

C. correct: carbon dioxide is transported in the blood mainly as bicarbonate ions ($HCO3^-$).

D. wrong: bicarbonate ions play the important role in CO2 transport.

Question 71 Incomplete double circulation is found in

Incomplete double circulation is found in:

- A. Aves
- B. Fishes
- C. Amphibians ✓ **Correct answer**
- D. Mammals

A. wrong: birds have complete double circulation.

B. wrong: fishes have a single circulation.

C. correct: incomplete double circulation is found in amphibians (the ventricle is not fully divided).

D. wrong: mammals have complete double circulation.

72 Choose the correct sentence

Choose the correct sentence.

- A. We bought some new clothing. ✓ **Correct answer**
- B. We bought some new clothings.
- C. We bought some new piece of clothings.
- D. We bought some new pieces of clothings.

A. correct: "clothing" is an uncountable noun, so "some new clothing" is correct.

B. wrong: "clothing" has no plural form.

C. wrong: "clothings" is not a word.

D. wrong: "clothings" is not a word.

Question 73 If a hole is bored through

If a hole is bored through the center of the earth and a pebble is dropped in it. Then it will:

- A. Execute SHM ✓ **Correct answer**
- B. Drop to the other side
- C. Stop at the center of the earth
- D. None of the above

A. correct: a pebble dropped in a hole bored through the centre of the Earth executes simple harmonic motion (the gravitational force inside the Earth is proportional to the distance from the centre).

B. wrong: the pebble oscillates through the centre — it executes SHM.

C. wrong: the pebble passes through the centre with maximum speed — it executes SHM.

D. wrong: the pebble executes SHM.

74 Which of the following animal is

Which of the following animal is included in protostom?

- A. Sea horse
- B. Sea mouse ✓ **Correct answer**
- C. Sea cucumber
- D. Sea lion

A. wrong: the sea horse is a fish (a chordate, a deuterostome).

B. correct: the sea mouse (Aphrodite, a polychaete worm) is a protostome.

C. wrong: the sea cucumber is an echinoderm (a deuterostome).

D. wrong: the sea lion is a mammal (a chordate, a deuterostome).

Question 75 How many walking legs are present

How many walking legs are present in arachnids?

- A. 4
- B. 6
- C. 8 ✓ **Correct answer**
- D. 10

A. wrong: arachnids have 8 walking legs.

B. wrong: arachnids have 8 walking legs (6 legs is insects).

C. correct: arachnids have 8 walking legs (four pairs).

D. wrong: arachnids have 8 walking legs.

Question 76 A child she was soon bored

A _____ child, she was soon bored in class; she already knew more mathematics than her

ol teachers.

- A. Contemporary
- B. Lethargic
- C. Obdurate
- D. Precocious ✓ **Correct answer**

A. wrong: "precocious" means unusually advanced for one's age.

B. wrong: "precocious" means unusually advanced for one's age.

C. wrong: "obdurate" means stubborn.

D. correct: a precocious child is one who is unusually advanced (mentally) for their age.

Question 77 Sea-fungi is related to

Sea-fungi is related to:

- A. Zygomycota
- B. Ascomycota ✓ **Correct answer**
- C. Basidiomycota
- D. Deutromycota

A. wrong: sea-fungi are related to the Ascomycota.

B. correct: sea-fungi (marine fungi) are mostly related to the Ascomycota.

C. wrong: sea-fungi are related to the Ascomycota.

D. wrong: sea-fungi are related to the Ascomycota.

Question 78 Black bread mold is

Black bread mold is:

- A. Rhizopus ✓ **Correct answer**

- C. Mucor
- D. Yeast

A. correct: black bread mold is Rhizopus (Rhizopus stolonifer).

B. wrong: Penicillium is the blue-green mold.

C. wrong: Mucor is a different mold (pin mold), not the black bread mold.

D. wrong: yeast is a unicellular fungus, not the black bread mold.

Question 79 Which of the statements about paper

Which of the statements about paper chromatography is not correct:

- A. Paper chromatography is an example of partition chromatography.
- B. Paper chromatography greatest use is in the separation of biological active systems.
- C. Paper chromatography is also applicable for the separation of some inorganic cations.
- D. Paper chromatography is always used for quantitative analysis. ✓ **Correct answer**

A. wrong as the not-correct statement: paper chromatography IS an example of partition chromatography.

B. wrong as the not-correct statement: this is true of paper chromatography.

C. wrong as the not-correct statement: this is true of paper chromatography.

D. correct as the not-correct statement: paper chromatography is mainly used for qualitative analysis, not always for quantitative analysis.

80 Equal volume of different gases under

Equal volume of different gases under same condition of temperature and pressure contain the same number of particles. The above statement is:

- A. Avogadro’s law ✓ **Correct answer**
- B. Graham’s Law
- C. Dalton’s law
- D. Hund’s rule

A. correct: Avogadro's law states that equal volumes of different gases under the same conditions of temperature and pressure contain the same number of particles (molecules).

B. wrong: Graham's law is about the rates of diffusion of gases.

C. wrong: Dalton's law is about the partial pressures of gases in a mixture.

D. wrong: Hund's rule is about the filling of orbitals.

Question 81 Which is the correct statement

Which is the correct statement?

- A. The average kinetic energy of the molecules depends on the volume in which the gas is enclosed
- B. The average kinetic energy of the molecules in the gaseous state is proportional to the pressure.
- C. The average kinetic energy of the molecules in the gaseous state is proportional to the temperature. ✓ **Correct answer**
- D. All of the above

A. wrong: the average kinetic energy depends on the temperature, not the volume.

B. wrong: the average kinetic energy is proportional to the temperature, not the pressure.

e average kinetic energy of gas molecules is proportional to the absolute temperature (KE = 3/2 kT).

D. wrong: only the temperature statement is correct.

Question 82 In a vibrating cord the point

In a vibrating cord the point where the particles are stationary is called:

- A. Crest
- B. Anti-node
- C. Node ✓ **Correct answer**
- D. Trough

A. wrong: a crest is a point of maximum displacement, not a stationary point.

B. wrong: an antinode is a point of maximum vibration.

C. correct: in a vibrating cord the point where the particles are stationary is called a node.

D. wrong: a trough is a point of maximum displacement in the opposite direction.

Question 83 The minimum frequency of incident light

The minimum frequency of incident light required to emit photoelectrons from the metal surface is called:

- A. Critical frequency
- B. Intermediate frequency
- C. Work function
- D. Threshold frequency ✓ **Correct answer**

A. wrong: the minimum frequency is called the threshold frequency.

B. wrong: the minimum frequency is called the threshold frequency.

C. wrong: the work function is the minimum energy (not frequency) needed to emit

D. correct: the minimum frequency of incident light required to emit photoelectrons from a metal surface is called the threshold frequency.

Question 84 A racing car accelerates uniformly through

A racing car accelerates uniformly through three gear changes with the following average speeds: 20ms-1 for 2.0s, 40ms-1 for 2.0s and 60ms-1 for 6.0s. What is the overall average speed of the car?

- A. 12ms-1
- B. 13.3ms-1
- C. 48ms-1 ✓ **Correct answer**
- D. 40ms-1

A. wrong: the overall average speed is 48 m/s.

B. wrong: the overall average speed is 48 m/s.

C. correct: total distance = 20×2 + 40×2 + 60×6 = 480 m, total time = 10 s, so the average speed is 480/10 = 48 m/s.

D. wrong: the overall average speed is 48 m/s.

Question 85 In octopus the foot is modified

In octopus, the foot is modified into:

- A. Disc
- B. Arm ✓ **Correct answer**
- C. Foot
- D. Siphon

A. wrong: in the octopus the foot is modified into arms.

the octopus the foot is modified into arms (tentacles).

C. wrong: the foot is modified into arms.

D. wrong: the siphon is a separate structure (the funnel), not the modified foot.

Question 86 Which of the following is included

Which of the following is included into deuterostome?

- A. Brittle star ✓ **Correct answer**
- B. Scorpion
- C. Chaetopterus
- D. Unio

A. correct: the brittle star is an echinoderm, and echinoderms are deuterostomes.

B. wrong: the scorpion is an arthropod (a protostome).

C. wrong: Chaetopterus is a polychaete worm (a protostome).

D. wrong: Unio (a mussel) is a mollusc (a protostome).

Question 87 Choose the correct sentence

Choose the correct sentence:

- A. The lecture was long a bore and uninspired.
- B. The lecture was long a bore and uninspiring.
- C. The lecture was long boring and uninspiring. ✓ **Correct answer**
- D. The lecture was a long a bore and an uninspiring.

A. wrong: "long a bore" is ungrammatical.

B. wrong: "long a bore" is ungrammatical.

C. correct: "The lecture was long, boring and uninspiring."

long a bore" is ungrammatical.

Question 88 Murein cell-wall is composed of

Murein cell-wall is composed of:

- A. Sugar and amino acids
- B. Calcium pectate.
- C. Glycoprotein
- D. Peptidoglycan ✓ **Correct answer**

A. wrong as the answer here: murein is peptidoglycan (sugar + amino acids is only part of the description — the named substance is peptidoglycan).

B. wrong: calcium pectate is found in plant cell walls (middle lamella).

C. wrong: murein is peptidoglycan.

D. correct: the murein cell wall is composed of peptidoglycan.

Question 89 The genome of the most animals

The genome of the most animals and higher plants is:

- A. DNA ✓ **Correct answer**
- B. RNA
- C. Both DNA and RNA
- D. Either DNA or RNA

A. correct: the genome of most animals and higher plants is DNA.

B. wrong: RNA is the genome only of some viruses.

C. wrong: the genome of most animals and higher plants is DNA.

D. wrong: the genome of most animals and higher plants is DNA.

90 Which statement is wrong about the

Which statement is wrong about the fourth state of matter known as plasma?

- A. The plasma contain equal amount of positive and negative charges and are almost neutral as a whole
- B. Plasma exists in the atmosphere of stars
- C. Plasma exists in the region around the sun
- D. There is less amount of matter in plasma state than the familiar, solid, liquid and gaseous states. ✓ **Correct answer**

A. wrong as the wrong statement: plasma does contain equal amounts of positive and negative charges and is almost neutral as a whole.

B. wrong as the wrong statement: plasma does exist in stars.

C. wrong as the wrong statement: plasma does exist around the sun.

D. correct as the wrong statement: plasma is in fact the most abundant state of matter in the universe (about 99% of visible matter), so there is MORE matter in the plasma state than in the solid, liquid and gaseous states.

Question 91 Hydrogen bonding do not exist in

Hydrogen bonding do not exist in the molecule of:

- A. Hydrogen ✓ **Correct answer**
- B. Proteins
- C. Carbohydrates
- D. Ammonia

A. correct: hydrogen bonding does not exist in the hydrogen molecule (H2) — there is no H bonded to a highly electronegative atom with a lone pair.

B. wrong as the answer here: hydrogen bonding exists in proteins.

the answer here: hydrogen bonding exists in carbohydrates.

D. wrong as the answer here: hydrogen bonding exists in ammonia.

Question 92 Deficiency of which of the following

Deficiency of which of the following causes diuresis?

- A. LH
- B. ACTH
- C. FSH
- D. ADH ✓ **Correct answer**

A. wrong: ADH deficiency causes diuresis.

B. wrong: ADH deficiency causes diuresis.

C. wrong: ADH deficiency causes diuresis.

D. correct: deficiency of ADH (antidiuretic hormone, vasopressin) causes diuresis (diabetes insipidus) — the kidneys cannot reabsorb water.

Question 93 ACQUAINTANCE means a person whom

'ACQUAINTANCE' means a person whom:

- A. One loves but whom one cannot marry.
- B. One knows but who is not a close friend. ✓ **Correct answer**
- C. One can depend on for help in hour of need.
- D. One can hire for attempting a question paper.

A. wrong: an acquaintance is a person one knows but who is not a close friend.

B. correct: an "acquaintance" means a person whom one knows but who is not a close friend.

C. wrong: that describes a friend, not an acquaintance.

acquaintance is a person one knows but who is not a close friend.

Question 94 In angiosperms the megaspore develops into

In angiosperms the megaspore develops into:

- A. Embryo-Sac ✓ **Correct answer**
- B. Embryo
- C. Seed
- D. Male gametophyte

A. correct: in angiosperms the megaspore develops into the embryo sac (female gametophyte).

B. wrong: the embryo develops from the zygote.

C. wrong: the seed develops from the ovule.

D. wrong: the male gametophyte develops from the microspore.

Question 95 All of the following plants posses

All of the following plants posses hermaphrodite flowers except:

- A. Lathyrus odoratus
- B. Solanum nigrum
- C. Zea-mays ✓ **Correct answer**
- D. Avena-sativa

A. wrong as the answer here: sweet pea has hermaphrodite (bisexual) flowers.

B. wrong as the answer here: Solanum has hermaphrodite flowers.

C. correct: maize (Zea mays) has unisexual flowers (separate male and female flowers), not hermaphrodite flowers.

D. wrong as the answer here: oat has hermaphrodite flowers.

96 Choose the correct relation about the

Choose the correct relation about the percent yield. It is equal to:

- A. (Actual yield / Theoretical yield) × 100 ✓ **Correct answer**
- B. (Theoretical yield / Actual yield) × 100
- C. (Actual yield / Theoretical yield) × 10^6
- D. (Theoretical yield / Actual yield) × 10^3

A. correct: the percent yield is (actual yield / theoretical yield) × 100.

B. wrong: the percent yield is (actual yield / theoretical yield) × 100.

C. wrong: the percent yield is (actual yield / theoretical yield) × 100.

D. wrong: the percent yield is (actual yield / theoretical yield) × 100. (Noted: the options as printed read "× 10^0" in the reproduction's extraction; the source prints × 100 — the percent-yield factor.)

Question 97 Vapour pressure of a liquid can

Vapour pressure of a liquid can be measured by the Barometric method and Manometric:

- A. Barometric method is more accurate than Manometric method. ✓ **Correct answer**
- B. Manometric method is more accurate than Barometric method.
- C. Both are equally accurate and applicable.
- D. Both methods are in use but are not reliable.

A. correct: the barometric method is more accurate than the manometric method for measuring vapour pressure.

B. wrong: the barometric method is more accurate.

C. wrong: the barometric method is more accurate.

e barometric method is more accurate and reliable.

Question 98 Which is incorrect about ionization energy

Which is incorrect about ionization energy?

- A. Ionization energy depends upon the magnitude of nuclear charge.
- B. Ionization energy depends upon the atomic radius
- C. Ionization energy depends upon the shielding effect.
- D. Ionization energy does not depend upon the penetration effect of the inner orbital. ✓ **Correct answer**

A. wrong as the incorrect statement: ionisation energy does depend on the nuclear charge.

B. wrong as the incorrect statement: ionisation energy does depend on the atomic radius.

C. wrong as the incorrect statement: ionisation energy does depend on the shielding effect.

D. correct as the incorrect statement: ionisation energy DOES depend on the penetration effect of the inner orbitals, so this statement is wrong.

Question 99 Several resistors are connected in parallel

Several resistors are connected in parallel the resistance of their equivalent resistor will:

- A. Increase
- B. Decrease ✓ **Correct answer**
- C. Not change
- D. None of these

A. wrong: the equivalent resistance decreases.

B. correct: when several resistors are connected in parallel, the equivalent resistance is less than the smallest individual resistance — it decreases.

e equivalent resistance decreases.

D. wrong: the equivalent resistance decreases.

Question 100 Which of the following series lie

Which of the following series lie in the visible region?

- A. Lyman
- B. Paschen
- C. Balmer ✓ **Correct answer**
- D. Pfund

A. wrong: the Lyman series lies in the ultraviolet region.

B. wrong: the Paschen series lies in the infrared region.

C. correct: the Balmer series (transitions to n = 2) lies in the visible region.

D. wrong: the Pfund series lies in the infrared region.

Question 101 Kirchhoffs first law KCL is based

Kirchhoff’s first law (KCL) is based upon the law of conservation of:

- A. Charge ✓ **Correct answer**
- B. Energy
- C. Mass
- D. momentum

A. correct: Kirchhoff's first law (current law) is based on the law of conservation of charge.

B. wrong: Kirchhoff's second law (voltage law) is based on the conservation of energy.

C. wrong: Kirchhoff's first law is based on the conservation of charge.

D. wrong: Kirchhoff's first law is based on the conservation of charge.

102 Accessory pigments are

Accessory pigments are:

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

A. wrong: accessory pigments are red, orange and yellow.

B. wrong: accessory pigments are red, orange and yellow.

C. wrong: accessory pigments are red, orange and yellow.

D. correct: accessory pigments (carotenoids and xanthophylls) are red, orange and yellow.

Question 103 Chemiosmosis occurs in the

Chemiosmosis occurs in the:

- A. Grana
- B. Stroma
- C. Thylakoids ✓ **Correct answer**
- D. InterGrana

A. wrong as the answer here: chemiosmosis occurs across the thylakoid membrane (in the grana) — the thylakoid is the precise site.

B. wrong: chemiosmosis occurs in the thylakoids.

C. correct: chemiosmosis (ATP synthesis by the proton gradient) occurs across the thylakoid membrane.

D. wrong: chemiosmosis occurs in the thylakoids.

104 Select the incorrect Statement

Select the incorrect Statement:

- A. Molecule may gain electron to form molecular anion.
- B. Molecule may lose electron to form molecular cation.
- C. Molecular cations are less abundant than molecular anions. ✓ **Correct answer**
- D. These molecular ions can be formed by passing high energy electron beam through a gas.

A. wrong as the incorrect statement: a molecule can gain an electron to form a molecular anion.

B. wrong as the incorrect statement: a molecule can lose an electron to form a molecular cation.

C. correct as the incorrect statement: in mass spectrometry molecular cations are MORE abundant than molecular anions (positive ions are formed far more readily).

D. wrong as the incorrect statement: molecular ions are formed by a high-energy electron beam.

Question 105 Choose the correct Statement

Choose the correct Statement:

- A. The most direct and accurate method for determining atomic masses uses mass spectroscopy. ✓ **Correct answer**
- B. The indirect but accurate method for determining molecular masses uses mass spectroscopy.
- C. Collision between the electrons and the atoms produces negative ions by absorption of electrons by atoms or molecules.
- D. The first application of the mass spectroscopy was the demonstration to detect various isotopes of Argon.

ass spectroscopy is the most direct and accurate method for determining atomic masses.

B. wrong: mass spectroscopy is the most direct method, not an indirect one.

C. wrong: collisions of electrons with atoms usually produce positive ions (by knocking out electrons).

D. wrong: the first application of mass spectroscopy was the detection of the isotopes of neon.

Question 106 The partition coefficient of Iodine distribution

The partition coefficient of Iodine distribution between two immiscible liquids, water and carbon tetrachloride is given below: K = [I2 in water] / [I2 in CCl4] = 1.17×10-2 Choose the correct Statement about the system:

- A. Iodine is extracted from CCl4 layer by water.
- B. Iodine is extracted from aqueous layer by CCl4. ✓ **Correct answer**
- C. Iodine is more soluble in water than CCl4.
- D. The value of K depends on the amount of Iodine added.

A. wrong: iodine prefers the CCl4 layer (K is small).

B. correct: K = [I2]water/[I2]CCl4 = 1.17×10^{-2} is much less than 1, so iodine is far more soluble in CCl4 and is extracted from the aqueous layer by CCl4.

C. wrong: iodine is more soluble in CCl4 than in water.

D. wrong: the partition coefficient is constant at a given temperature, independent of the amount added.

Question 107 During the experiment one measured the

During the experiment one measured the mass of Mosquito and found it 1.20×10-5 Kg.

...rs of significant figures in this case are:

- A. Five
- B. One
- C. Two
- D. Three ✓ **Correct answer**

A. wrong: 1.20×10^{-5} has three significant figures.

B. wrong: 1.20×10^{-5} has three significant figures.

C. wrong: 1.20×10^{-5} has three significant figures.

D. correct: 1.20×10^{-5} kg has three significant figures (1, 2 and 0 — the trailing zero after the decimal point counts).

Question 108 The vectors A and B are

The vectors A and B are such that $|A + B| = |A - B|$. Then the angle between the two vectors is:

- A. 0°
- B. 90° ✓ **Correct answer**
- C. 60°
- D. 180°

A. wrong: the angle is 90°.

B. correct: $|A + B| = |A - B|$ gives $A^2 + B^2 + 2AB\cos\theta = A^2 + B^2 - 2AB\cos\theta$, so $\cos\theta = 0$ and $\theta = 90°$.

C. wrong: the angle is 90°.

D. wrong: the angle is 90°.

109 If two heterozygous tall plants are

If two heterozygous tall plants are crossed together the proportion of Phenotypically tall plants will be:

- A. 50%
- B. 25%
- C. 75% ✓ **Correct answer**
- D. 100%

A. wrong: crossing two heterozygous tall plants (Tt × Tt) gives 75% tall offspring.

B. wrong: 25% are short (tt); 75% are tall.

C. correct: Tt × Tt gives TT, Tt, Tt, tt — three of the four (75%) are phenotypically tall.

D. wrong: 25% of the offspring are short.

Question 110 A spore of Fern plant develops

A spore of Fern plant develops into:

- A. Zygote
- B. Sporophyte
- C. Gametophyte ✓ **Correct answer**
- D. Prothallus

A. wrong: a fern spore develops into the gametophyte (prothallus), not a zygote.

B. wrong: the spore develops into the gametophyte; the sporophyte develops from the zygote.

C. correct as one of the two correct options: a fern spore develops into the gametophyte.

D. correct as one of the two correct options: the fern gametophyte IS the prothallus (the small heart-shaped plant). (PICK-ONE: the printed key gives both C and D — the gametophyte of a fern is the prothallus, so both options are correct; C is filed as the

ded by the assistant under the owner's 8 Nov 2026 delegation.)

Question 111 Choose the correct Statement

Choose the correct Statement:

- A. 2Li7 + 2He4 → 5B10 + 1n0
- B. 2Li7 + 2He4 → 5B9 + 1p0
- C. 4Be9 + 2He4 → 6C12 + 0n1 ✓ **Correct answer**
- D. 4Be9 + 2He4 → 6C12 + 1p1

A. wrong as printed: the atomic numbers do not balance — the left side gives 2 + 2 = 4 while the right side gives 5 + 0 = 5 (lithium's atomic number is 3, not 2 as printed).

B. wrong: the mass numbers do not balance (7 + 4 = 11, but 9 + 1 = 10).

C. correct: mass numbers balance (9 + 4 = 12 + 1) and atomic numbers balance (4 + 2 = 6 + 0) — this is the correct nuclear equation.

D. wrong: the atomic numbers do not balance (4 + 2 = 6, but 6 + 1 = 7).

Question 112 Select the correct relation between wave

Select the correct relation between wave and particle nature of radiation:

- A. E = hc / λ ✓ **Correct answer**
- B. E = hλ / c
- C. E = λc / h
- D. E = hλc

A. correct: the relation between the wave and particle nature of radiation is E = hc/λ (E = hν = hc/λ).

B. wrong: the correct relation is E = hc/λ.

C. wrong: the correct relation is E = hc/λ.

e correct relation is E = hc/λ.

Question 113 Change in concentration of a reactant

Change in concentration of a reactant is plotted against time and the slope dx/dt determined. The value of dx/dt are plotted against (a – x)2 a straight line is obtained. It may be concluded that the reaction is:

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

A. wrong: a straight line of dx/dt against $(a - x)^2$ shows the reaction is second order.

B. correct: the rate is proportional to $(a - x)^2$, so the reaction is second order.

C. wrong: the rate is proportional to $(a - x)^2$, so the reaction is second order.

D. wrong: the rate is proportional to $(a - x)^2$, so the reaction is second order.

Question 114 Which statement correctly describes a nucleon

Which statement correctly describes a nucleon?

- A. Any atomic nucleus
- B. A radioactive atomic nucleus
- C. A neutron or a proton. ✓ **Correct answer**
- D. A neutron, proton or an electron.

A. wrong: a nucleon is a neutron or a proton.

B. wrong: a nucleon is a neutron or a proton.

C. correct: a nucleon is a neutron or a proton (a particle of the nucleus).

D. wrong: an electron is not a nucleon.

115 An object travels at constant speed

An object travels at constant speed around a circle of radius 1.0m in 1.0s. What is the magnitude of its acceleration?

- A. Zero
- B. 1.0 ms-1
- C. 2π ms-1
- D. 4π2 ms-2 ✓ **Correct answer**

A. wrong: the acceleration is $4\pi^2$ m/s².

B. wrong: the acceleration is $4\pi^2$ m/s² (and the units are m/s², not m/s).

C. wrong: the acceleration is $4\pi^2$ m/s² (2π m/s is the speed).

D. correct: the speed is $v = 2\pi r/T = 2\pi$ m/s, so the centripetal acceleration is $v^2/r = 4\pi^2/1 = 4\pi^2$ m/s².

Question 116 An alternating current IA varies with

An alternating current 'I/A' varies with time 't/s' according to the equation I = 5 sin(100π t). What is the mean power developed by the current in a resistive load of resistance 10Ω?

- A. 250W
- B. 500W
- C. 125W ✓ **Correct answer**
- D. 160W

A. wrong: the mean power is 125 W.

B. wrong: the mean power is 125 W.

C. correct: Irms = 5/√2 A, so the mean power is $I_{rms}^2 R = (25/2) \times 10 = 125$ W.

D. wrong: the mean power is 125 W.

117 The oxygen carrying capacity of haemoglobin

The oxygen carrying capacity of haemoglobin in humans when the blood is 100% oxygenated is:

- A. 19.4 ml
- B. 19.6 ml
- C. 20 ml ✓ **Correct answer**
- D. 21 ml

A. wrong: the oxygen-carrying capacity of haemoglobin at 100% oxygenation is 20 ml.

B. wrong: the oxygen-carrying capacity of haemoglobin at 100% oxygenation is 20 ml.

C. correct: when the blood is 100% oxygenated, haemoglobin carries 20 ml of oxygen per 100 ml of blood.

D. wrong: the oxygen-carrying capacity of haemoglobin at 100% oxygenation is 20 ml.

Question 118 Which of the following fish have

Which of the following fish have 14 pairs of gill slits?

- A. Dog fish
- B. Lamprey ✓ **Correct answer**
- C. Cat fish
- D. Ray fish

A. wrong: the dogfish has 5 pairs of gill slits.

B. correct: the lamprey is the fish with the most gill slits among the options (the textbook answer; the paper's "14 pairs" is a slip for 14 gill slits — 7 pairs — the lamprey's count).

C. wrong: the catfish has 4 pairs of gill slits.

D. wrong: the ray has 5 pairs of gill slits.

Question 119 Liquid crystalline substances are used to

Liquid crystalline substances are used to locate tumors in the body because:

- A. These parts of the body are warmer than the surroundings. ✓ **Correct answer**
- B. These parts of the body are cooler than the surroundings.
- C. These parts of the body are constantly increasing and decreasing with the temperature.
- D. None of the above.

A. correct: liquid crystalline substances are used to locate tumours because the tumour parts of the body are warmer than the surroundings (liquid crystals change colour with temperature).

B. wrong: the tumour parts are warmer.

C. wrong: the tumour parts are warmer than the surroundings.

D. wrong: the tumour parts are warmer than the surroundings.

Question 120 The potential difference between a pair

The potential difference between a pair of similar, parallel conducting plates is known. What additional information is needed in order to find the electric field strength between the plates?

- A. Separation of the plates. ✓ **Correct answer**
- B. Separation and area of the plates.
- C. Permittivity of the medium separation of the plates.
- D. Permittivity of the medium and area of the plates.

A. correct: the field strength is E = V/d, so only the separation of the plates is needed in addition to the potential difference.

B. wrong: the area is not needed (E = V/d).

e permittivity is not needed (E = V/d).

D. wrong: only the separation is needed (E = V/d).

Question 121 In an AC capacitive circuit current

In an AC capacitive circuit current and voltage phase relation is:

- A. In-phase
- B. current leads voltage by 90° ✓ **Correct answer**
- C. Voltage leads current by 90°
- D. Current leads voltage by 180°

A. wrong: in a capacitive circuit the current leads the voltage by 90°.

B. correct: in an a.c. capacitive circuit the current leads the voltage by 90°.

C. wrong: the current leads the voltage by 90° (voltage leads in an inductive circuit).

D. wrong: the current leads the voltage by 90°, not 180°.

Question 122 A capacitor which has a capacitance

A capacitor which has a capacitance of 1 farad will:

- A. Be fully charged in 1 second by a current of 1 ampere.
- B. Store 1 coulomb of charge at potential difference of 1 volt. ✓ **Correct answer**
- C. Gain 1 joule of energy when 1 coulomb of charge is stored on it.
- D. Discharge in 1 second when connected across a resistor of resistance 3 ohm.

A. wrong: a 1 F capacitor stores 1 C at 1 V, but "fully charged" is not defined by 1 s.

B. correct: capacitance C = Q/V, so a 1 F capacitor stores 1 coulomb of charge at a potential difference of 1 volt.

C. wrong: the energy is ½QV = 0.5 J.

e discharge time depends on RC = 3 s, not 1 s.

Question 123 In which of the following pharynx

In which of the following pharynx opens directly into intestine?

- A. Planaria ✓ **Correct answer**
- B. Earthworm
- C. Cockroach
- D. Snail

A. correct: in Planaria the pharynx opens directly into the intestine (there is no oesophagus).

B. wrong: in the earthworm the pharynx leads to the oesophagus.

C. wrong: in the cockroach the pharynx leads to the oesophagus.

D. wrong: in the snail the pharynx does not open directly into the intestine.

Question 124 Bile is released from the gall

Bile is released from the gall bladder by the action of:

- A. Gastrin
- B. Cholecystokinin ✓ **Correct answer**
- C. Secretin
- D. Renin

A. wrong: cholecystokinin releases bile from the gall bladder.

B. correct: bile is released from the gall bladder by the action of cholecystokinin (CCK).

C. wrong: secretin stimulates pancreatic juice, not bile release.

D. wrong: renin is a kidney enzyme that regulates blood pressure.

125 Choose the correct sentence

Choose the correct sentence:

- A. He will reach in two hours time.
- B. He will reach in two hour time.
- C. He will reach in two hour's time.
- D. He will reach in two hours' time. ✓ **Correct answer**

A. wrong: the possessive form is needed — "two hours' time".

B. wrong: "two hour time" is not correct.

C. wrong: the plural possessive "hours'" is needed, not "hour's".

D. correct: "He will reach in two hours' time."

Question 126 To decrease the salt potential the

To decrease the salt potential the Guard cells absorb:

- A. Sodium Ions
- B. Magnesium ions
- C. Potassium ions ✓ **Correct answer**
- D. Calcium ions

A. wrong: guard cells absorb potassium ions to decrease the salt (water) potential.

B. wrong: guard cells absorb potassium ions.

C. correct: to decrease the salt potential (make it more negative) the guard cells absorb potassium ions (K^+), which draws water in and opens the stoma.

D. wrong: guard cells absorb potassium ions.

127 The products of light dependent reactions

The products of light dependent reactions are:

- A. RUBP + ATP
- B. RUBP + PGAL
- C. NADPH + ATP ✓ **Correct answer**
- D. PGAL + ATP

A. wrong: the products of the light-dependent reactions are NADPH and ATP.

B. wrong: the products of the light-dependent reactions are NADPH and ATP.

C. correct: the products of the light-dependent reactions are NADPH and ATP (which drive the dark reactions).

D. wrong: the products of the light-dependent reactions are NADPH and ATP.

Question 128 The committee dissented from the reports

The committee dissented from the report's conclusions. The underlined word means:

- A. Differed ✓ **Correct answer**
- B. Joined
- C. Deliberated
- D. Agreed

A. correct: "dissented" means differed (disagreed) — the committee disagreed with the report's conclusions.

B. wrong: "dissented" means differed, not joined.

C. wrong: "dissented" means differed, not deliberated.

D. wrong: "dissented" is the opposite of agreed.

Question 129 All of the following are gametophytes

All of the following are gametophytes except:

- A. Club Mosses ✓ **Correct answer**
- B. Funaria
- C. Liver-Worts
- D. Horn-Worts

A. correct as the exception: in club mosses (Lycopodium) the dominant plant is the sporophyte, not the gametophyte.

B. wrong as the exception: in Funaria (a moss) the dominant plant is the gametophyte.

C. wrong as the exception: in liverworts the dominant plant is the gametophyte.

D. wrong as the exception: in hornworts the dominant plant is the gametophyte.

Question 130 All of the following are dioecious

All of the following are dioecious except:

- A. Ulva
- B. Funaria ✓ **Correct answer**
- C. Marchantia
- D. Polytrichum

A. wrong as the exception: Ulva is dioecious (separate male and female plants).

B. correct as the exception: Funaria is monoecious (both male and female organs on the same plant), not dioecious.

C. wrong as the exception: Marchantia is dioecious.

D. wrong as the exception: Polytrichum is dioecious.

131 The van der Waals equation of

The van der Waals equation of state for non-ideal gases differs from the ideal gas law in that it accounts for: I) The mass of each molecule of the gas. II) The volume of each molecule of the gas. III) The attractive forces between molecules of the gas.

- A. I, II and III
- B. I and II only
- C. I and III only
- D. II and III only ✓ **Correct answer**

A. wrong: the van der Waals equation does not account for the mass of each molecule.

B. wrong: the van der Waals equation accounts for the volume of the molecules and the attractive forces, not the mass.

C. wrong: the van der Waals equation accounts for the volume of the molecules and the attractive forces, not the mass.

D. correct: the van der Waals equation accounts for (II) the volume of each molecule and (III) the attractive forces between molecules — not the mass of each molecule.

Question 132 The statement that heat cannot spontaneously

The statement that heat cannot spontaneously flow from a colder to a hotter body is a result of:

- A. Henry’s law
- B. The first law of thermodynamics
- C. The second law of thermodynamics ✓ **Correct answer**
- D. The third law of thermodynamics.

A. wrong: Henry's law is about gas solubility.

B. wrong: the first law is the conservation of energy.

e statement that heat cannot spontaneously flow from a colder to a hotter body is the second law of thermodynamics (Clausius statement).

D. wrong: the third law is about entropy at absolute zero.

Question 133 Rutherfords scattering experiment demonstrate

Rutherford’s scattering experiment demonstrate:

- A. The existence of X-rays.
- B. The existence of α-particles.
- C. The mass to charge ratio of electron.
- D. The nuclear model of the atom. ✓ **Correct answer**

A. wrong: Rutherford's scattering experiment demonstrated the nuclear model of the atom.

B. wrong: Rutherford's scattering experiment demonstrated the nuclear model of the atom.

C. wrong: the mass-to-charge ratio of the electron was measured by Thomson.

D. correct: Rutherford's α-particle scattering experiment demonstrated the nuclear model of the atom (a small dense nucleus).

Question 134 What is the relationship between the

What is the relationship between the intensity ‘I’ and the amplitude ‘a’ of a wave?

- A. I a = constant
- B. I a2 = constant
- C. I / a = constant
- D. I / a2 = constant ✓ **Correct answer**

A. wrong: intensity is proportional to the square of the amplitude.

tensity is proportional to the square of the amplitude.

C. wrong: intensity is proportional to the square of the amplitude.

D. correct: the intensity of a wave is proportional to the square of its amplitude ($I \propto a^2$), so I/a^2 is constant.

Question 135 Which is a statement of the

Which is a statement of the principle of conservation of momentum?

- A. Momentum is the product of mass and velocity.
- B. Momentum is conserved only in elastic collisions
- C. Momentum is conserved by all bodies in a collision.
- D. Momentum is conserved providing no external forces act. ✓ **Correct answer**

A. wrong: this is the definition of momentum, not the conservation principle.

B. wrong: momentum is conserved in all collisions when no external forces act.

C. wrong as the statement of the principle: momentum is conserved only when no external forces act.

D. correct: the principle of conservation of momentum states that momentum is conserved providing no external forces act.

Question 136 A projectile is launched at 45

A projectile is launched at 45° to the horizontal with initial kinetic energy E. Assuming air resistance to be negligible, what will be the kinetic energy of the projectile when it reaches its highest point?

- A. 0.50 E ✓ **Correct answer**
- B. 0.71 E
- C. 0.87 E
- D. E

: the highest point only the horizontal component of velocity remains ($v \cdot \cos 45° = v/\sqrt{2}$), so the kinetic energy is $(1/2)mv^2/2 = E/2 = 0.50\ E$.

B. wrong: the kinetic energy at the highest point is 0.50 E.

C. wrong: the kinetic energy at the highest point is 0.50 E.

D. wrong: the kinetic energy at the highest point is 0.50 E.

Question 137 Coelenterates have hydrostatic skeleton except

Coelenterates have hydrostatic skeleton except:

- A. Coral ✓ **Correct answer**
- B. Sea anemone
- C. Hydra
- D. Jelly fish

A. correct as the exception: corals have a hard calcareous skeleton, not a hydrostatic skeleton.

B. wrong as the exception: the sea anemone has a hydrostatic skeleton.

C. wrong as the exception: Hydra has a hydrostatic skeleton.

D. wrong as the exception: the jellyfish has a hydrostatic skeleton.

Question 138 Lungs are in origin

Lungs are _____ in origin.

- A. Ectodermal
- B. Endodermal ✓ **Correct answer**
- C. Mesodermal
- D. Preformed

A. wrong: the lungs are endodermal in origin.

The lungs develop from the endoderm (the foregut endoderm).

C. wrong: the lungs are endodermal in origin.

D. wrong: the lungs are endodermal in origin.

Question 139 The particular array of chromosomes that

The particular array of chromosomes that an individual possessed is called its:

- A. Genotype
- B. Phenotype
- C. Karyotype ✓ **Correct answer**
- D. Genome

A. wrong: the genotype is the genetic constitution (the alleles present).

B. wrong: the phenotype is the observable characteristics.

C. correct: the particular array (number, size and shape) of chromosomes that an individual possesses is called its karyotype.

D. wrong: the genome is the complete set of genetic material.

Question 140 APPRAISE means

'APPRAISE' means:

- A. Praise a man out of place.
- B. Tell a story at bed time.
- C. Evaluate the quality of ✓ **Correct answer**
- D. Do shopping in a bazar

A. wrong: "appraise" means to evaluate the quality of something.

B. wrong: "appraise" means to evaluate the quality of something.

ppraise" means to evaluate the quality (or value) of something.

D. wrong: "appraise" means to evaluate the quality of something.

Question 141 An Ascus develops

An Ascus develops:

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

A. wrong: an ascus develops 8 ascospores.

B. wrong: an ascus develops 8 ascospores.

C. wrong: an ascus develops 8 ascospores.

D. correct: an ascus develops 8 ascospores (after meiosis and one mitotic division).

Question 142 The cell wall of fungus like

The cell wall of fungus like protista is composed of:

- A. Chitin
- B. Cellulose ✓ **Correct answer**
- C. Murein
- D. Lignin

A. wrong: the cell wall of fungus-like protists (oomycetes) is composed of cellulose.

B. correct: the cell wall of fungus-like protists is composed of cellulose (unlike true fungi, whose walls are chitin).

C. wrong: murein is the bacterial cell wall material.

nin is found in plant cell walls.

Question 143 Which is incorrect statement

Which is incorrect statement?

- A. The ionic bonds are non directional in character.
- B. The crystals of covalent compounds are made up of molecules.
- C. The covalent bonds are rigid and non directional. ✓ **Correct answer**
- D. Ionic compounds have high melting point and boiling point.

A. wrong as the incorrect statement: ionic bonds are indeed non-directional.

B. wrong as the incorrect statement: crystals of covalent compounds are made up of molecules.

C. correct as the incorrect statement: covalent bonds are directional (they act in fixed directions), so this statement is wrong.

D. wrong as the incorrect statement: ionic compounds do have high melting and boiling points.

Question 144 In which compound the bond angle

In which compound the bond angle is maximum?

- A. Methane
- B. Beryllium chloride ✓ **Correct answer**
- C. Ammonia
- D. Boron trifluoride

A. wrong: methane has a bond angle of 109.5°.

B. correct: beryllium chloride (BeCl2) is linear with a bond angle of 180° — the maximum among the options.

ammonia has a bond angle of 107°.

D. wrong: boron trifluoride has a bond angle of 120°.

Question 145 Which is not used in calculating

Which is not used in calculating the lattice energy of crystalline solids?

- A. Haber process ✓ **Correct answer**
- B. Born Haber cycle
- C. Hess's law
- D. Enthalpy changes

A. correct as the answer: the Haber process (ammonia synthesis) is not used in calculating the lattice energy of crystalline solids — the Born–Haber cycle is.

B. wrong as the answer here: the Born–Haber cycle IS used to calculate lattice energy.

C. wrong as the answer here: Hess's law IS used in the Born–Haber cycle calculation.

D. wrong as the answer here: enthalpy changes ARE used in the calculation.

Question 146 A mass accelerates uniformly when the

A mass accelerates uniformly when the resultant force acting on it:

- A. Is zero
- B. Is constant but not zero ✓ **Correct answer**
- C. Increases uniformly with respect to time.
- D. Is proportional to the displacement of the mass from a fixed point.

A. wrong: with zero resultant force there is no acceleration.

B. correct: a mass accelerates uniformly when the resultant force acting on it is constant but not zero (F = ma, so a is constant).

C. wrong: a uniformly increasing force gives a uniformly increasing acceleration, not

D. wrong: that gives simple harmonic motion, not uniform acceleration.

Question 147 The prefix pico stands for

The prefix ‘pico’ stands for:

- A. 106
- B. 109
- C. 10-12 ✓ **Correct answer**
- D. 1012

A. wrong: "pico" stands for 10^{-12}.

B. wrong: "pico" stands for 10^{-12}.

C. correct: the prefix "pico" stands for 10^{-12}.

D. wrong: "pico" stands for 10^{-12} (10^{12} is "tera").

Question 148 The first artificial radioactive substance was

The first artificial radioactive substance was made by bombarding aluminum 13Al27, with α-particle. This produced an unstable isotope of phosphorus, 15P30. What was the by product of this reaction?

- A. An α-particle
- B. A β-particle
- C. A γ-ray
- D. A neutron ✓ **Correct answer**

A. wrong: the by-product was a neutron.

B. wrong: the by-product was a neutron.

C. wrong: the by-product was a neutron.

$Al^{27} + He^{4} \rightarrow P^{30} + n^{1}$ — the by-product of this first artificial radioactivity reaction (Joliot-Curie) was a neutron.

Question 149 Which species has no net charge

Which species has no net charge?

- A. An α-particle
- B. An electron
- C. A proton
- D. A neutrino ✓ **Correct answer**

A. wrong: an α-particle has a charge of +2e.

B. wrong: an electron has a charge of −e.

C. wrong: a proton has a charge of +e.

D. correct: a neutrino has no net charge (it is electrically neutral).

Question 150 If the coding sequence on the

If the coding sequence on the DNA is AATTGCT, the sequence in the mRNA will be:

- A. AAUUCGT
- B. UUAACGA ✓ **Correct answer**
- C. TTAACGA
- D. UUTTCGT

A. wrong: the mRNA sequence is UUAACGA.

B. correct: reading the given DNA strand as the template (antisense) strand, the mRNA is its complement with uracil in place of thymine — AATTGCT gives UUAACGA.

C. wrong: mRNA contains uracil, not thymine.

D. wrong: the mRNA sequence is UUAACGA. (Noted: the given sequence is treated as the

and, the mRNA is its complement.)

Question 151 Gene and chromosomes show parallel behavior

Gene and chromosomes show parallel behavior except:

- A. Number
- B. Inheritance
- C. Heredity
- D. Composition ✓ **Correct answer**

A. wrong as the exception: genes and chromosomes show parallel behaviour in number.

B. wrong as the exception: genes and chromosomes show parallel behaviour in inheritance.

C. wrong as the exception: genes and chromosomes show parallel behaviour in heredity.

D. correct as the exception: genes and chromosomes do NOT show parallel behaviour in composition (chromosomes are made of DNA and protein, genes are segments of DNA).

Question 152 Mortal stay implies

‘Mortal stay’ implies:

- A. Life that a man will have after death.
- B. Life spent in the company of friend.
- C. Life passed in hostel without studying.
- D. Life in this world which is short lived. ✓ **Correct answer**

A. wrong: "mortal stay" means life in this world, which is short-lived.

B. wrong: "mortal stay" means life in this world, which is short-lived.

C. wrong: "mortal stay" means life in this world, which is short-lived.

D. correct: "mortal stay" implies life in this world, which is short-lived.

153 Chlorophyll is protected from intense light

Chlorophyll is protected from intense light by:

- A. Phytochrome
- B. Phytokinin
- C. Phytocyanin
- D. Carotenoids ✓ **Correct answer**

A. wrong: carotenoids protect chlorophyll from intense light.

B. wrong: carotenoids protect chlorophyll from intense light.

C. wrong: carotenoids protect chlorophyll from intense light.

D. correct: chlorophyll is protected from intense light (photo-oxidation) by carotenoids.

Question 154 Replication of DNA occurs during

Replication of DNA occurs during:

- A. Interphase ✓ **Correct answer**
- B. Prophase
- C. Metaphase
- D. Anaphase

A. correct: replication of DNA occurs during interphase (the S phase).

B. wrong: DNA replication occurs in interphase, not prophase.

C. wrong: DNA replication occurs in interphase, not metaphase.

D. wrong: DNA replication occurs in interphase, not anaphase.

Question 155 Which of the following compound is

Which of the following compound is assigned the octane number of 100?

- B. n-octane
- C. 2,3,3-trimethyl pentane
- D. 2,2,4-trimethyl pentane ✓ **Correct answer**

A. wrong: n-heptane is assigned the octane number 0.

B. wrong: the octane number 100 is assigned to 2,2,4-trimethylpentane.

C. wrong: the octane number 100 is assigned to 2,2,4-trimethylpentane.

D. correct: 2,2,4-trimethylpentane (isooctane) is assigned the octane number of 100.

Question 156 The major product of acid catalysed

The major product of acid catalysed dehydration of 3-pentanol is:

- A. 1-Pentene
- B. 2-Pentene ✓ **Correct answer**
- C. 2-Methylbutane
- D. 3-Methylbutane

A. wrong: the major product is 2-pentene (the more substituted alkene).

B. correct: acid-catalysed dehydration of 3-pentanol gives 2-pentene as the major product (Saytzeff's rule — the more substituted alkene).

C. wrong: the product is 2-pentene, not 2-methylbutane.

D. wrong: the product is 2-pentene, not 3-methylbutane.

Question 157 Which of the following compound will

Which of the following compound will react most readily with bromine in CCl4?

- A. 1-Pentene
- B. 2-Pentene

ethyl-1-butene ✓ **Correct answer**

- D. 3-Methyl-1-butene

A. wrong: 2-methyl-1-butene reacts most readily (it forms a tertiary carbocation).

B. wrong: 2-methyl-1-butene reacts most readily.

C. correct: 2-methyl-1-butene reacts most readily with bromine in CCl_4 — its double bond is the most electron-rich and it forms a tertiary carbocation intermediate.

D. wrong: 2-methyl-1-butene reacts most readily.

Question 158 The half life of 22Na is

The half life of 22Na is 2.6 years. If X grams of this sodium isotope are initially present how much is left after 13 years?

- A. X/32 ✓ **Correct answer**
- B. X/13
- C. X/8
- D. X/5

A. correct: 13 years is 13/2.6 = 5 half-lives, so the amount left is $X \times (1/2)^5 = X/32$.

B. wrong: the amount left is X/32.

C. wrong: 13 years is 5 half-lives, not 3.

D. wrong: the amount left is X/32.

Question 159 Monochromatic light passes through two parallel

Monochromatic light passes through two parallel slits in a screen and falls on a piece of film. The pattern produced is an example of:

- A. refraction and diffraction
- B. Interference and reflection

rference and diffraction ✓ **Correct answer**

- D. Diffraction and polarization.

A. wrong: the pattern is an example of interference and diffraction.

B. wrong: the pattern is an example of interference and diffraction.

C. correct: the pattern of bright and dark fringes from two slits is an example of interference and diffraction.

D. wrong: the pattern is an example of interference and diffraction.

Question 160 The senator is opposed this new

The senator is opposed _____ this new legislation.

- A. at
- B. to ✓ **Correct answer**
- C. try
- D. on

A. wrong: "opposed at" is not correct.

B. correct: "The senator is opposed to this new legislation."

C. wrong: "opposed try" is not correct.

D. wrong: "opposed on" is not correct.

Question 161 Sodium chloride crystal structure is

Sodium chloride crystal structure is:

- A. Hexagonal
- B. Body centered cubic
- C. Face centered cubic ✓ **Correct answer**
- D. Tetragonal

dium chloride has a face-centred cubic structure.

B. wrong: sodium chloride has a face-centred cubic structure.

C. correct: the sodium chloride crystal structure is face-centred cubic.

D. wrong: sodium chloride has a face-centred cubic structure.

Question 162 An acid is a substance which

An acid is a substance which accepts:

- A. An electron pair ✓ **Correct answer**
- B. Proton
- C. An electron
- D. Pair of proton

A. correct: a Lewis acid is a substance which accepts an electron pair.

B. wrong: a substance that donates a proton is a Brønsted acid; an acid that accepts an electron pair is a Lewis acid.

C. wrong: an acid (Lewis) accepts an electron pair, not a single electron.

D. wrong: an acid (Lewis) accepts an electron pair.

Question 163 Carbon-14 is used in carbon dating

Carbon-14 is used in carbon dating. Which of the following species has both same number of neutrons and same number of electrons as in atom of C-14?

- A. 147N+
- B. 168O2+ ✓ **Correct answer**
- C. 179F+
- D. 1814Si

A. wrong: $^{14}N^{+}$ has 7 neutrons and 6 electrons.

^{14} has 8 neutrons and 6 electrons; $^{16}O^{2+}$ has 16 − 8 = 8 neutrons and 8 − 2 = 6 electrons.

C. wrong: $^{17}F^{+}$ has 8 neutrons but 8 electrons.

D. wrong: ^{18}Si would have 4 neutrons and 14 electrons (and silicon-18 does not occur).

Question 164 A student connects a 6 volt

A student connects a 6 volt battery and a 12 volt battery in series and then connects this combination across a 10Ω resistor. What is the current in the resistor?

- A. 0.8 A
- B. 1.8 A ✓ **Correct answer**
- C. 0.9 A
- D. 2.6 A

A. wrong: the current is 1.8 A.

B. correct: the two batteries in series give 6 + 12 = 18 V, so the current is I = V/R = 18/10 = 1.8 A.

C. wrong: the current is 1.8 A.

D. wrong: the current is 1.8 A.

Question 165 A step-up transformer is one that

A step-up transformer is one that:

- A. Increase the power
- B. Increase the current
- C. Increase the voltage ✓ **Correct answer**
- D. Increase the energy

A. wrong: a transformer cannot increase the power (power is conserved, apart from

B. wrong: a step-up transformer decreases the current.

C. correct: a step-up transformer is one that increases the voltage (with more turns in the secondary coil).

D. wrong: a transformer cannot increase the energy.

Question 166 The waves which do not require

The waves which do not require any medium for their propagation are called:

- A. Mechanical waves
- B. Sound waves
- C. Tidal waves
- D. Electromagnetic waves ✓ **Correct answer**

A. wrong: mechanical waves need a medium.

B. wrong: sound waves need a medium.

C. wrong: tidal waves need a medium (water).

D. correct: electromagnetic waves do not require any medium for their propagation.

Question 167 Add some milk and sugar the

Add some milk and sugar _____ the afternoon tea.

- A. with
- B. in
- C. on
- D. to ✓ **Correct answer**

A. wrong: "add milk and sugar to the tea" is correct.

dd milk and sugar to the tea" is correct.

C. wrong: "add milk and sugar to the tea" is correct.

D. correct: "Add some milk and sugar to the afternoon tea."

Question 168 In vacuum all electromagnetic waves have

In vacuum all electromagnetic waves have the same:

- A. Speed ✓ **Correct answer**
- B. Energy
- C. Frequency
- D. Wavelength

A. correct: in vacuum all electromagnetic waves travel at the same speed (3×10^8 m/s).

B. wrong: different electromagnetic waves have different energies.

C. wrong: different electromagnetic waves have different frequencies.

D. wrong: different electromagnetic waves have different wavelengths.

Question 169 Human arm is homologous with

Human arm is homologous with:

- A. Sea flipper
- B. Octopus Tentacle
- C. Bird wing
- D. Both A and C ✓ **Correct answer**

A. wrong as the answer here: the human arm is homologous with both the sea flipper and the bird wing.

B. wrong: the octopus tentacle is analogous, not homologous, to the human arm.

the answer here: the human arm is homologous with both the sea flipper and the bird wing.

D. correct: the human arm is homologous with the sea flipper (whale) and the bird wing — all are pentadactyl forelimbs.

Question 170 A specific nucleotide sequence on DNA

A specific nucleotide sequence on DNA molecule to which RNA polymerase attaches to initiate transcription of mRNA from a gene is called:

- A. Poly genes
- B. Genome
- C. Promoter ✓ **Correct answer**
- D. Pleiotropy

A. wrong: the sequence is called a promoter.

B. wrong: the sequence is called a promoter.

C. correct: the specific nucleotide sequence on a DNA molecule to which RNA polymerase attaches to initiate transcription is called a promoter.

D. wrong: pleiotropy is one gene affecting several traits.

Question 171 Break the ice implies

'Break the ice' implies:

- A. Walk on ice-sheet
- B. Swallow ice-cube
- C. Chisel an ice-block
- D. to make beginning ✓ **Correct answer**

A. wrong: "break the ice" means to make a beginning.

"break the ice" means to make a beginning.

C. wrong: "break the ice" means to make a beginning.

D. correct: "to break the ice" implies to make a beginning (to start a conversation or social interaction).

Question 172 All of the following belong to

All of the following belong to phylum Protista except:

- A. Protomycota
- B. Gymnomycota
- C. Oomycota
- D. Deutromycota ✓ **Correct answer**

A. wrong as the exception: Protomycota are fungus-like protists.

B. wrong as the exception: Gymnomycota are fungus-like protists.

C. wrong as the exception: Oomycota are fungus-like protists.

D. correct as the exception: Deutromycota (deuteromycetes, the imperfect fungi) belong to the fungi, not to the protists.

Question 173 A special protein carrier in plasma

A special protein carrier in plasma membrane is:

- A. Catalase
- B. Lipase
- C. Permease ✓ **Correct answer**
- D. Arginase

A. wrong: permease is the carrier protein in the plasma membrane.

B. wrong: permease is the carrier protein in the plasma membrane.

ermease is the special carrier protein in the plasma membrane that transports substances across it.

D. wrong: permease is the carrier protein in the plasma membrane.

Question 174 Reduction of acetaldehyde with H2Ni gives

Reduction of acetaldehyde with H2/Ni gives:

- A. Ethanol ✓ **Correct answer**
- B. Ethanoic acid
- C. Ethane
- D. Ethylene

A. correct: reduction of acetaldehyde with H2/Ni gives ethanol (CH3CHO + H2 → CH3CH2OH).

B. wrong: reduction gives ethanol, not ethanoic acid.

C. wrong: reduction gives ethanol, not ethane.

D. wrong: reduction gives ethanol, not ethylene.

Question 175 Which of the following compounds will

Which of the following compounds will give a positive test with Fehling’s solution?

- A. Acetone
- B. Ethyl acetate
- C. Formaldehyde ✓ **Correct answer**
- D. Acetic acid

A. wrong: acetone (a ketone) does not give a positive Fehling's test.

B. wrong: ethyl acetate (an ester) does not give a positive Fehling's test.

C. correct: formaldehyde (an aldehyde) gives a positive test with Fehling's solution (red

f Cu2O).

D. wrong: acetic acid does not give a positive Fehling's test.

Question 176 Choose the compound in which hydrogen

Choose the compound in which hydrogen bonding is not possible:

- A. H2O
- B. HCl ✓ **Correct answer**
- C. CH3COOH
- D. CH3OCH3

A. wrong: hydrogen bonding is possible in water.

B. correct: hydrogen bonding is not possible in HCl — hydrogen bonding needs hydrogen attached to a highly electronegative atom (N, O or F), and chlorine is too large and too little electronegative.

C. wrong: hydrogen bonding is possible in acetic acid.

D. wrong as the answer here: dimethyl ether can accept hydrogen bonds (its oxygen has lone pairs), while HCl cannot form hydrogen bonds at all.

Question 177 A ball is dropped from the

A ball is dropped from the roof of a very tall building. What is its velocity after falling for 5.0s?

- A. 1.96 m/s
- B. 9.80 m/s
- C. 49.0 m/s ✓ **Correct answer**
- D. 98.0 m/s

A. wrong: the velocity is 49.0 m/s.

e velocity is 49.0 m/s.

C. correct: v = gt = 9.80 × 5.0 = 49.0 m/s.

D. wrong: the velocity is 49.0 m/s.

Question 178 In liquid metal fast breeder reactor

In liquid metal fast breeder reactor the moderator used is:

- A. Graphite
- B. Heavy water
- C. Boron rods
- D. Not required. ✓ **Correct answer**

A. wrong: a fast breeder reactor needs no moderator.

B. wrong: a fast breeder reactor needs no moderator.

C. wrong: boron rods are control rods, not a moderator, and a fast breeder reactor needs no moderator.

D. correct: in a liquid metal fast breeder reactor the neutrons are fast, so no moderator is required.

Question 179 The de-Broglie wavelength of a rifle

The de-Broglie wavelength of a rifle bullet of mass 0.02kg which is moving at a speed of 300ms-1 is (where h = 6.63×10-34 Js):

- A. 7.3 × 10-34 m
- B. 1.1 × 10-34 m ✓ **Correct answer**
- C. 1.8 × 10-35 m
- D. 9.9 × 10-34 m

A. wrong: the de Broglie wavelength is 1.1×10^{-34} m.

$= h/mv = 6.63 \times 10^{-34}/(0.02 \times 300) = 6.63 \times 10^{-34}/6 \approx 1.1 \times 10^{-34}$ m.

C. wrong: the de Broglie wavelength is 1.1×10^{-34} m.

D. wrong: the de Broglie wavelength is 1.1×10^{-34} m.

Question 180 The theory of new creation was

The theory of new creation was proposed by:

- A. George Cuvier
- B. James Hutton
- C. Louis Agassiz ✓ **Correct answer**
- D. Wallace

A. wrong: Cuvier proposed catastrophism.

B. wrong: Hutton proposed uniformitarianism.

C. correct: the theory of new creation (special creation) was proposed by Louis Agassiz.

D. wrong: Wallace proposed natural selection (with Darwin).

Question 181 The bone dissolving cells are called

The bone dissolving cells are called:

- A. Osteoclast ✓ **Correct answer**
- B. Osteoblasts
- C. Osteocytes
- D. Fibroblast

A. correct: osteoclasts are the bone-dissolving (bone-resorbing) cells.

B. wrong: osteoblasts build bone.

C. wrong: osteocytes are mature bone cells that maintain bone tissue.

roblasts form connective tissue, not bone.

Question 182 An elegy is a poem written

An ‘elegy’ is a poem written:

- A. In the memory of little child
- B. On the death of someone dear. ✓ **Correct answer**
- C. On the sighting of an old tutor
- D. In the love of dear sweetheart.

A. wrong: an elegy is a poem on the death of someone dear.

B. correct: an elegy is a poem written on the death of someone dear (a lament).

C. wrong: an elegy is a poem on the death of someone dear.

D. wrong: an elegy is a poem on the death of someone dear.

Question 183 The temperature required for vernalization is

The temperature required for vernalization is approximately:

- A. 2°C
- B. 3°C
- C. 4°C ✓ **Correct answer**
- D. 10°C

A. wrong: the temperature required for vernalisation is approximately 4 °C.

B. wrong: the temperature required for vernalisation is approximately 4 °C.

C. correct: the temperature required for vernalisation is approximately 4 °C (low temperature treatment).

D. wrong: the temperature required for vernalisation is approximately 4 °C.

184 The response of a plant related

The response of a plant related to the length of the day and night is called:

- A. Photo-receptor
- B. Photo-taxis
- C. Photo-tropism
- D. Photo-periodism ✓ **Correct answer**

A. wrong: the response to day/night length is photoperiodism.

B. wrong: phototaxis is movement towards or away from light.

C. wrong: phototropism is growth towards light.

D. correct: the response of a plant related to the length of day and night is called photoperiodism.

Question 185 Which of the following polymers contain

Which of the following polymers contain nitrogen?

- A. PVC
- B. Terylene
- C. Nylon ✓ **Correct answer**
- D. Teflon

A. wrong: PVC (polyvinyl chloride) contains no nitrogen.

B. wrong: Terylene (a polyester) contains no nitrogen.

C. correct: nylon (a polyamide) contains nitrogen in its amide linkages.

D. wrong: Teflon (PTFE) contains no nitrogen.

186 Which one of the following does

Which one of the following does not exist?

- A. HBO2
- B. HFO2 ✓ **Correct answer**
- C. H3PO3
- D. HBrO2

A. wrong: HBO2 (metaboric acid) exists.

B. correct: HFO2 does not exist (fluorine forms HOF, but not HFO2).

C. wrong: H3PO3 (phosphorous acid) exists.

D. wrong: HBrO2 (bromous acid) exists.

Question 187 Select the strongest acid the pKa

Select the strongest acid the pKa values are given:

- A. HI, pKa = -10 ✓ **Correct answer**
- B. HCN, pKa = 9.4
- C. H2SO4, pKa = 1.8
- D. HNO3, pKa = 3.0

A. correct: the strongest acid has the lowest pKa — HI with pKa = −10.

B. wrong: HCN is the weakest acid here.

C. wrong: HI (pKa −10) is stronger.

D. wrong: HI (pKa −10) is stronger.

Question 188 An electron in a hydrogen atom

An electron in a hydrogen atom makes a transition from an energy level with energy E1,

energy E2 and simultaneously emits a photon. The wavelength of the emitted photon is:

- A. hc / (E1 – E2) ✓ **Correct answer**
- B. h / (E1 – E2)
- C. h / c(E1 – E2)
- D. (E1 – E2) / hc

A. correct: the photon energy is E1 − E2 = hc/λ, so λ = hc/(E1 − E2).

B. wrong: the wavelength is hc/(E1 − E2).

C. wrong: the wavelength is hc/(E1 − E2).

D. wrong: this is 1/λ, not λ.

Question 189 The electric field between the plates

The electric field between the plates of an isolated air-spaced parallel-plate capacitor is E. What is the field between the plates after immersing the capacitor in a liquid of relative permittivity 10?

- A. √10 E
- B. E / √10
- C. 10E
- D. E / 10 ✓ **Correct answer**

A. wrong: the field becomes E/10.

B. wrong: the field becomes E/10.

C. wrong: the field becomes E/10.

D. correct: the capacitor is isolated, so the charge (and σ) is fixed; immersing it in a dielectric of relative permittivity 10 reduces the field to E/εr = E/10.

190 He was arrested and charged murder

He was arrested and charged _____ murder.

- A. with ✓ **Correct answer**
- B. into
- C. over
- D. about

A. correct: "He was arrested and charged with murder."

B. wrong: "charged into" is not correct.

C. wrong: "charged over" is not correct.

D. wrong: "charged about" is not correct.

Question 191 Providing heat to the following reaction

Providing heat to the following reaction causes it shift to the right: CO2(g) + 2H2O(g) ↔️ CH4(g) + 2O2(g) The reaction can therefore be described as:

- A. Spontaneous
- B. Adiabatic
- C. Endothermic ✓ **Correct answer**
- D. Exothermic

A. wrong: the reaction is described as endothermic (heat shifts it right).

B. wrong: the reaction is described as endothermic.

C. correct: providing heat shifts the equilibrium to the right, so the forward reaction absorbs heat — it is endothermic.

D. wrong: heat shifts the reaction right, so it is endothermic, not exothermic.

192 The major sources responsible for the

The major sources responsible for the presence of NO, N2O, NO2 in the atmosphere is / are:

- A. Fertilizers
- B. Biological decay of deadly organism
- C. Fossil fuel combustion
- D. All of these ✓ **Correct answer**

A. wrong as the answer here: fertilisers, biological decay and fossil fuel combustion are all major sources.

B. wrong as the answer here: fertilisers, biological decay and fossil fuel combustion are all major sources.

C. wrong as the answer here: fertilisers, biological decay and fossil fuel combustion are all major sources.

D. correct: fertilisers, biological decay and fossil fuel combustion are all major sources of NO, N2O and NO2 in the atmosphere.

Question 193 Polyhydroxy aldehydes or ketones are known

Polyhydroxy aldehydes or ketones are known as:

- A. Carbohydrates ✓ **Correct answer**
- B. Proteins
- C. Lipids
- D. Vitamins

A. correct: polyhydroxy aldehydes or ketones are known as carbohydrates.

B. wrong: proteins are polymers of amino acids.

C. wrong: lipids are esters of fatty acids and glycerol.

vitamins are organic compounds needed in small amounts.

Question 194 A shot is fired at an

A shot is fired at an angle of 60° to the horizontal with kinetic energy E. If air resistance is ignored, the kinetic energy at the top of the trajectory is:

- A. Zero
- B. E/8
- C. E/4 ✓ **Correct answer**
- D. E/2

A. wrong: the kinetic energy at the top is E/4.

B. wrong: the kinetic energy at the top is E/4.

C. correct: at the top only the horizontal component remains ($v \cdot \cos 60° = v/2$), so the kinetic energy is $E \times (1/2)^2 = E/4$.

D. wrong: the kinetic energy at the top is E/4.

Question 195 The displacement x of a particle

The displacement ‘x’ of a particle at time ‘t’ is given by $x = 10 \sin 4t$. The particle oscillates with period:

- A. π/10 s
- B. π/5 s
- C. π/4 s
- D. π/2 s ✓ **Correct answer**

A. wrong: the period is π/2 s.

B. wrong: the period is π/2 s.

C. wrong: the period is π/2 s.

= 10 sin 4t gives ω = 4, so the period is T = 2π/ω = 2π/4 = π/2 s.

Question 196 By how many times does doubling

By how many times does doubling the diameter of a wire and making it 10 times longer increase its resistance?

- A. 2.5 times ✓ **Correct answer**
- B. 5 times
- C. 10 times
- D. 30 times

A. correct: $R = \rho L/A$ with $A \propto d^2$; doubling d divides R by 4 and making it 10 times longer multiplies R by 10, so R increases by 10/4 = 2.5 times.

B. wrong: the resistance increases by 2.5 times.

C. wrong: the resistance increases by 2.5 times.

D. wrong: the resistance increases by 2.5 times.

Question 197 second thoughts I opted for a

_____ second thoughts I opted for a cold drink.

- A. At
- B. By
- C. On ✓ **Correct answer**
- D. For

A. wrong: "on second thoughts" is the correct idiom.

B. wrong: "on second thoughts" is the correct idiom.

C. correct: "On second thoughts I opted for a cold drink."

D. wrong: "on second thoughts" is the correct idiom.

198 Sucrose is considered as

Sucrose is considered as:

- A. Monosaccharides
- B. Disaccharides ✓ **Correct answer**
- C. Polysaccharides
- D. None of these

A. wrong: sucrose is a disaccharide.

B. correct: sucrose is a disaccharide (glucose + fructose).

C. wrong: sucrose is a disaccharide.

D. wrong: sucrose is a disaccharide.

Question 199 High molecular mass compound was hydrolyzed

High molecular mass compound was hydrolyzed, the product was analyzed and found to be amino acid. The compound is:

- A. Protein ✓ **Correct answer**
- B. Lipid
- C. Carbohydrate
- D. Vitamins

A. correct: a high molecular mass compound that hydrolyses to amino acids is a protein.

B. wrong: lipids hydrolyse to fatty acids and glycerol.

C. wrong: carbohydrates hydrolyse to monosaccharides.

D. wrong: vitamins do not hydrolyse to amino acids.

200 The enzymes functions are optimum at

The enzymes functions are optimum at:

- A. Specific Temperature
- B. Specific PH
- C. Specific co-enzyme
- D. All the above ✓ **Correct answer**

A. wrong as the answer here: enzyme function is optimum at a specific temperature, a specific pH and with a specific co-enzyme.

B. wrong as the answer here: enzyme function is optimum at a specific temperature, a specific pH and with a specific co-enzyme.

C. wrong as the answer here: enzyme function is optimum at a specific temperature, a specific pH and with a specific co-enzyme.

D. correct: enzyme function is optimum at a specific temperature, a specific pH and with a specific co-enzyme.

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