MDCAT (UHS entry test) — 2019 · Solved Past Paper

Body: University of Health Sciences, Lahore (UHS) · **Post:** MDCAT (UHS entry test) · **Year:** 2019 · **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 2019 sitting.

Source note: mdcatguide.com compilation 'UHS MDCAT 2019' (26 pages, scanned, no text layer), Paper ID-A, 200 MCQs, 150 minutes, 200 marks, no negative marking, pass mark 120/200. Held Sunday 25 August 2019, 10:00 am. Sections: Biology 80, Chemistry 60, Physics 40, English 20. The official UHS answer key is NOT in this compilation (the cover says it is at the back; the key pages were replaced by mdcatguide library/ads pages, PDF pp. 24–26). Verification: Learnospot/PLS Academy quiz 'UHS MDCAT Past Paper 1' (quiz id 267), correct answers extracted from the quiz scripts (base64-encoded answer ids) and mapped to paper letters by option text; signed official UHS key photo on Instagram @mentrmdcat used as arbitration for disputed items; textbook fact and worked derivations for every answer. A second copy of the paper itself ('UHS 2019 A-Key.pdf', public Google Drive folder 1x0NXX_b1DhZn-wShwlNpGrqizZYYUp8K) is a cleaner 'Sidhu'-watermarked scan of the paper, not key tables, used only as a visual backup for ambiguous stems. 5 key corrections vs the Learnospot key (Q1, Q2, Q13, Q47, Q184). All 200 stems and options visually verified against the rendered pages of the source scan. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

1 Biology

In chemiosmosis the proton (H+) pumps moves from ___.

- A. Stroma to Lumen ✓ **Correct answer**
- B. Stroma to cytoplasm
- C. Lumen to Stroma
- D. Cytoplasm to Stroma

A. The proton pumps of the thylakoid membrane move H+ from the stroma into the thylakoid lumen, building the gradient that drives ATP synthesis.

B. Protons are not pumped from the stroma into the cytoplasm during chemiosmosis.

C. Lumen to stroma is the direction of flow back through ATP synthase, not the direction of the pumps.

D. No proton pumping from cytoplasm to stroma occurs in chemiosmosis. (Key: Learnospot/PLS key lists C — Lumen to Stroma; corrected to A — the paper asks the direction of the proton PUMP, which moves H+ from stroma to lumen. The Learnospot stem is reworded to the chemiosmotic flow through ATP synthase.)

Question 2 Biology

Microtubule subunits (for spindle fibers) are synthesized in ___ phase.

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

A. Synthesis of microtubule subunits (tubulin) is a G2-phase event, preparing the cell for mitosis.

B. In M phase the spindle is already assembled and functioning.

for DNA synthesis and chromosome doubling, not tubulin synthesis.

D. G1 is the growth phase before DNA synthesis. (Key: Learnospot/PLS key lists C — S phase; corrected to A — G2. Punjab Board 2nd-year Biology notes list "Synthesis of microtubule subunits" as a G2-phase event, and the UHS 2019 past-paper MCQ is keyed G2.)

Question 3 Biology

If stimulation is above ___, impulses travel to the brain along the sensory neuron.

- A. Action Potential
- B. Threshold ✓ **Correct answer**
- C. Resting Potential
- D. Recovery Period

A. An action potential is the impulse itself, not the level stimulation must exceed.

B. A stimulus must exceed the threshold level to trigger an action potential that travels to the brain.

C. Resting potential is the membrane potential at rest, below threshold.

D. The recovery (refractory) period follows an impulse; it is not the trigger level.

Question 4 Biology

Substances responsible for increasing the set point of the hypothalamus are called:

- A. Pepsin
- B. Pyrogens ✓ **Correct answer**
- C. Prions
- D. Androgens

A. Pepsin is a stomach protease that digests protein; it does not reset the hypothalamic thermostat.

(bacterial products and cytokines such as interleukin-1) raise the hypothalamic set point, causing fever.

C. Prions are infectious misfolded proteins that cause neurodegenerative disease.

D. Androgens are male sex hormones; they do not raise the hypothalamic set point.

Question 5 Biology

During inspiration the space inside the chest cavity is increased due to:

- A. Increased pressure
- B. The relaxation of the muscles of the diaphragm
- C. Relaxation of the external intercostal muscles
- D. The contraction of the muscles of the diaphragm ✓ **Correct answer**

A. Pressure inside the chest falls during inspiration; increased pressure would oppose air entry.

B. Relaxation of the diaphragm lets it dome upward, shrinking the chest cavity.

C. The external intercostal muscles contract during inspiration to lift the ribs; their relaxation does not enlarge the chest.

D. Contraction flattens the diaphragm, increasing the volume of the chest cavity.

Question 6 Biology

Which of the following hormone stimulates the ovulation from the follicle into oviduct?

- A. Luteinizing hormone ✓ **Correct answer**
- B. Follicle stimulating hormone
- C. Estrogen
- D. Progesterone

A. The LH surge triggers ovulation, releasing the secondary oocyte from the follicle into

B. FSH stimulates the growth and maturation of the follicle, but does not trigger ovulation.

C. Oestrogen rises before ovulation and helps trigger the LH surge, but it is LH that causes ovulation.

D. Progesterone is secreted after ovulation by the corpus luteum.

Question 7 Biology

The covalent bond or bridge between two monosaccharides to form a disaccharide is called a:

- A. Carboxyl bond
- B. Hydroxyl bond
- C. Hydrogen bond
- D. Glycosidic bond ✓ **Correct answer**

A. A carboxyl group is -COOH; it does not link monosaccharides.

B. Hydroxyl groups (-OH) are present on sugars but do not form the bridge.

C. Hydrogen bonds are weak attractions, not the covalent bridge between sugars.

D. Two monosaccharides join by a covalent glycosidic bond (with loss of water).

Question 8 Biology

Site of protein synthesis is:

- A. Ribosomes ✓ **Correct answer**
- B. Lysosomes
- C. Golgi body
- D. Cisternae

A. Ribosomes are the sites where mRNA is translated into polypeptides.

s digest waste and worn-out organelles.

C. The Golgi body modifies, sorts and packages proteins.

D. Cisternae are the flattened sacs of the Golgi body and endoplasmic reticulum, not the site of synthesis.

Question 9 Biology

Water and Minerals move down their concentration gradient through plasmodesmata, to cells of cortex, endodermis, pericycle and then to sap in the xylem cells. This is also known as the:

- A. Symplastic Pathway ✓ **Correct answer**
- B. Mineral absorption Pathway
- C. Vacuolar pathway
- D. Apoplastic pathway

A. Movement through the cytoplasm of cells connected by plasmodesmata is the symplastic pathway.

B. Mineral absorption is a general process, not this specific route.

C. There is no vacuolar pathway for water and mineral transport.

D. The apoplastic pathway is movement through cell walls and intercellular spaces, not through plasmodesmata.

Question 10 Biology

Given below is the diagram of nephron without vascular supply. [Diagram: nephron with A = proximal convoluted tubule, B = loop of Henle, C = distal convoluted tubule, D = collecting tubule.] What is name of Part C?

- A. Collecting tubule
- B. Proximal tubule

al tubule ✓ **Correct answer**
- D. Loop of Henle

A. The collecting tubule (D) is the straight final duct of the nephron.

B. The proximal tubule (A) is the coiled part just after the glomerular capsule.

C. Part C is the distal convoluted tubule, the coiled segment after the loop of Henle.

D. The loop of Henle (B) is the long hairpin loop dipping into the medulla.

Note: Filed option D read "Loope of Henle" (misprint in the source reproduction); corrected to "Loop of Henle" as documented in the reviewed file.

Question 11 Biology

Xerophytes have small thick leaves to:

- A. Help them float on water
- B. Help them survive in salty environment
- C. Limit water loss by reducing the surface area ✓ **Correct answer**
- D. Limit water loss by increasing the surface area

A. Floating is an adaptation of hydrophytes, not xerophytes.

B. Salt tolerance is a halophyte adaptation, not the role of small thick leaves.

C. Small thick leaves reduce the surface area exposed to air, limiting water loss by transpiration.

D. Increasing surface area would increase water loss, the opposite of what xerophytes need.

Question 12 Biology

Among followings which cellular organelle contains circular DNA similar to those found

- A. Ribosome
- B. Lysosome
- C. Chloroplast ✓ **Correct answer**
- D. Nucleus

A. Ribosomes contain rRNA and protein, not circular DNA.

B. Lysosomes contain digestive enzymes, not DNA.

C. Chloroplasts contain their own circular DNA, like bacteria, supporting the endosymbiotic theory.

D. The nucleus contains linear chromosomes, not circular DNA.

Question 13 Biology

A person was married to his cousin and both are heterozygous for sickle cell anemia. Among their four kids, what will be proportion of affected homozygotes?

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

A. 50% is the proportion of heterozygous carriers (AS), not affected homozygotes.

B. Aa x Aa gives AA 25%, Aa 50%, aa 25%; the affected homozygotes (aa, SS) are 25%.

C. 75% would be the proportion carrying at least one sickle allele, not affected homozygotes.

D. 100% would require both parents to be affected homozygotes. (Key: Learnospot/PLS key lists A — 50%; corrected to B — 25%. AS x AS gives 25% SS affected homozygotes, 50% AS carriers, 25% AA.)

14 Biology

The route of urine excretion from kidney to outside of body is:

- A. Kidney -> ureter -> urinary bladder -> urethra ✓ **Correct answer**
- B. Urinary bladder -> kidney -> ureter -> urethra
- C. Kidney -> ureter -> urethra -> urinary bladder
- D. Kidney -> urethra -> urinary bladder -> ureter

A. Urine flows kidney, ureter, urinary bladder, urethra.

B. Urine cannot flow from the bladder back to the kidney.

C. The urethra comes after the bladder, not before it.

D. The ureter, not the urethra, carries urine from kidney to bladder.

Question 15 Biology

The phase of mitosis in which sister chromatids move towards opposite poles:

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

A. In prophase chromosomes condense and the spindle forms; chromatids do not separate.

B. In anaphase sister chromatids separate and move to opposite poles.

C. In telophase the nuclei reform around the separated chromosomes.

D. In metaphase chromosomes line up at the equator; they have not yet separated.

16 Biology

The Plasmid pBR322 has antibiotic resistance genes for:

- A. Tetracycline and Doxycycline
- B. Streptomycin
- C. Doxycycline and Ampicillin
- D. Ampicillin and Tetracycline ✓ **Correct answer**

A. pBR322 carries tetracycline resistance but not doxycycline resistance.

B. Streptomycin resistance is not carried by pBR322.

C. Doxycycline resistance is not carried by pBR322.

D. pBR322 carries the ampR (ampicillin) and tetR (tetracycline) resistance genes.

Question 17 Biology

The nitrogen containing bases in nucleotide are of two types; Purines and Pyrimidines; the purines bases are:

- A. Guanine and Cytosine
- B. Adenine, Guanine and Cytosine
- C. Adenine and Guanine ✓ **Correct answer**
- D. Adenine and Thymine

A. Cytosine is a pyrimidine, not a purine.

B. Cytosine is a pyrimidine; the purines are only adenine and guanine.

C. The purine bases are adenine and guanine.

D. Thymine is a pyrimidine, not a purine.

18 Biology

The following flowchart depicts the steps of the Calvin Cycle. Which option according to you fits in as the correct answer of the missing step? [Flowchart: CO2 + Rubisco -> 3-Phosphoglycerate -> (6 ATP) 1,3-Bisphosphoglycerate -> (6 NADPH) Glyceraldehyde 3-phosphate -> G3P (a sugar) out; the cycle returns through a '?' box to Rubisco.]

- A. Hydrogenase
- B. Oxaloacetate
- C. Ribulose bisphosphate ✓ **Correct answer**
- D. Pyruvate

A. Hydrogenase is not a Calvin cycle intermediate.

B. Oxaloacetate is an intermediate of the Krebs cycle and C4 pathway, not the Calvin cycle.

C. The missing step is the regeneration of ribulose bisphosphate (RuBP), the CO2 acceptor.

D. Pyruvate is a product of glycolysis, not a Calvin cycle intermediate.

Question 19 Biology

DNA polymerase enzyme for PCR is isolated from bacteria Thermus aquaticus because:

- A. It can withstand high denaturation temperature. ✓ **Correct answer**
- B. It can withstand low denaturation temperature.
- C. It can work at high speed
- D. It can be used again and again.

A. Taq polymerase from the thermophile Thermus aquaticus survives the high denaturation temperature (94C) of PCR cycles.

B. It is heat stability, not low-temperature tolerance, that matters in PCR.

C. Speed is not the reason Taq is used; heat stability is.

D. Reusability follows from heat stability but is not the reason for choosing this enzyme.

20 Biology

The type of energy reduced by the enzymes for biological reactions to occur is called the:

- A. Light Energy
- B. Activation energy ✓ **Correct answer**
- C. Active energy
- D. Heat energy

A. Light energy drives photosynthesis; enzymes do not reduce it.

B. Enzymes lower the activation energy, the energy barrier a reaction must overcome.

C. There is no such term as active energy in this context.

D. Heat energy is not the barrier enzymes lower.

Question 21 Biology

The function of calcium ions in muscle contraction is to:

- A. Bind to troponin molecule and cause them to move ✓ **Correct answer**
- B. Aid in the transmission of nerve impulse
- C. Polarize visible light
- D. Bind to tropomyosin molecule and cause them to form cross bridges

A. Ca^{2+} binds troponin, shifting tropomyosin and exposing myosin-binding sites on actin.

B. Ca^{2+} aids transmitter release at the synapse, but its role in the muscle fibre itself is troponin binding.

C. Polarizing light has nothing to do with calcium in muscle.

D. Calcium binds troponin, not tropomyosin; cross bridges are formed by myosin heads.

22 Biology

What is common in both Competitive and Non- Competitive Inhibition?

- A. Irreversible Inhibition
- B. Feedback Inhibition
- C. Reversible Inhibition ✓ **Correct answer**
- D. Non- Reversible Inhibition

A. Irreversible inhibition is a different class; both competitive and non-competitive inhibition are usually reversible.

B. Feedback inhibition is regulation by an end product, not a property of both types.

C. Both competitive and non-competitive inhibition are reversible: the inhibitor can leave the enzyme.

D. Non-reversible inhibition is not common to both types.

Question 23 Biology

Inside ovary, primary oocyte divides through first meiotic division forming two haploid cells, secondary oocyte and:

- A. Polar body ✓ **Correct answer**
- B. Oogonium
- C. Follicle cell
- D. Ovum

A. The first meiotic division of the primary oocyte gives a large secondary oocyte and a small first polar body.

B. Oogonia are the diploid germ cells that divide by mitosis to give primary oocytes.

C. Follicle cells surround the oocyte; they are not a product of its division.

D. The ovum forms only after the second meiotic division, after fertilisation.

24 Biology

Homozygous means:

- A. having two identical alleles of a gene. ✓ **Correct answer**
- B. having two identical genes
- C. alleles in an organism
- D. two different alleles of a gene.

A. Homozygous means having two identical alleles of a gene at a locus.

B. It is alleles of one gene that are identical, not two whole genes.

C. Alleles in an organism is too vague; homozygosity specifies identical alleles.

D. Two different alleles of a gene is heterozygous, not homozygous.

Question 25 Biology

Which hormonal pair would maintain the endometrium and make it receptive for implantation of embryo?

- A. Luteinising Hormone and Progesterone
- B. Estrogen and Follicle Stimulating Hormone
- C. Luteinising Hormone and Follicle Stimulating Hormone
- D. Estrogen and Progesterone ✓ **Correct answer**

A. LH plus progesterone is not the pair that maintains the endometrium.

B. FSH acts on the ovary, not directly on the endometrium.

C. FSH and LH are pituitary gonadotrophins, not the endometrial maintenance pair.

D. Oestrogen and progesterone together maintain the endometrium and make it receptive for implantation.

26 Biology

Starch is present in tubers, fruits, and grains but absent in animal cells. Instead, animals have a substance stored in liver and muscle, called:

- A. glucose
- B. glycogen ✓ **Correct answer**
- C. galactose
- D. glucagon

A. Glucose is the sugar carried in blood, not the storage form in liver and muscle.

B. Animals store carbohydrate as glycogen in the liver and muscles.

C. Galactose is a component of milk sugar, not the animal storage carbohydrate.

D. Glucagon is a hormone that mobilises glycogen; it is not the storage carbohydrate.

Question 27 Biology

Polio vaccine contains:

- A. Antisera
- B. Antibodies
- C. Antibiotics
- D. Antigens ✓ **Correct answer**

A. Antisera are antibody preparations given for passive immunity, not vaccine contents.

B. Antibodies are made by the body after vaccination; the vaccine itself contains antigens.

C. Antibiotics kill bacteria and are not the active content of a vaccine.

D. Polio vaccine contains weakened or killed poliovirus antigens that stimulate immunity.

28 Biology

Which of the following blood vessels contain semilunar valves?

- A. Arteries
- B. Veins ✓ **Correct answer**
- C. Arterioles
- D. Capillaries

A. Arteries have thick muscular walls and no valves (apart from the heart's own semilunar valves).

B. Veins contain semilunar valves that prevent backflow of blood.

C. Arterioles are small arteries and have no valves.

D. Capillaries are thin-walled exchange vessels with no valves.

Question 29 Biology

The main neurotransmitter for synapses which lie outside the central nervous system is:

- A. Choline
- B. Acetylcholine ✓ **Correct answer**
- C. Acetaldehyde
- D. Phosphatidylcholine

A. Choline is the precursor from which acetylcholine is made, not the transmitter itself.

B. Acetylcholine is the main neurotransmitter at synapses outside the central nervous system.

C. Acetaldehyde is a by-product of ethanol metabolism, not a neurotransmitter.

D. Phosphatidylcholine is a membrane phospholipid, not a neurotransmitter.

30 Biology

The thick filaments in a myofibril of muscles are made of:

- A. Haemoglobin
- B. Myoglobin
- C. Actin
- D. Myosin ✓ **Correct answer**

A. Haemoglobin carries oxygen in red blood cells, not in myofibrils.

B. Myoglobin stores oxygen in muscle cells; it does not form filaments.

C. Actin forms the thin filaments of the myofibril.

D. Thick filaments are made of myosin molecules.

Question 31 Biology

The prokaryotes possess small ribosome of size:

- A. 40S
- B. 70S ✓ **Correct answer**
- C. 65S
- D. 60S

A. 40S is the small subunit of the eukaryotic 80S ribosome.

B. Prokaryotic ribosomes are 70S (50S + 30S subunits).

C. 65S is not a ribosome size.

D. 60S is the large subunit of the eukaryotic 80S ribosome.

Question 32 Biology

The structure present in a eukaryotic cell but absent in prokaryotic cells is:

leus? ✓ **Correct answer**

- B. DNA
- C. Ribosomes
- D. Cell surface membrane

A. Eukaryotes have a membrane-bound nucleus; prokaryotes have no true nucleus.

B. Both eukaryotes and prokaryotes contain DNA.

C. Both contain ribosomes (80S in eukaryotes, 70S in prokaryotes).

D. Both have a cell surface membrane.

Question 33 Biology

The process in which a complementary copy of the code from a gene is produced by RNA Polymerase in the nucleus:

- A. Proof reading
- B. DNA Replication
- C. Transcription ✓ **Correct answer**
- D. Translation

A. Proof reading corrects errors during replication, it does not copy a gene into RNA.

B. DNA replication copies DNA into DNA, not into RNA.

C. Transcription is the RNA polymerase production of a complementary RNA copy of a gene.

D. Translation builds protein from mRNA at the ribosome.

Question 34 Biology

Sara is a chemistry student who is carrying out an experiment between an alcohol and acetic acid in the laboratory. The product formed at the end of the experiment will be:

- B. Glycogen and water molecule
- C. An ester and water molecule ✓ **Correct answer**
- D. Glycerol and Sulfuric acid

A. Glucose and oxygen are products of photosynthesis, not of this reaction.

B. Glycogen is an animal storage polysaccharide, not a product here.

C. An alcohol plus a carboxylic acid undergo esterification, giving an ester and water.

D. Glycerol and sulfuric acid are not products of alcohol plus acetic acid.

Question 35 Biology

In genetics, the term locus refers to the ___ of the gene on the chromosome.

- A. Frequency
- B. Copy
- C. Position ✓ **Correct answer**
- D. Inversion

A. Frequency refers to how often an allele occurs in a population.

B. Copy number is not what locus means.

C. A locus is the specific position of a gene on a chromosome.

D. An inversion is a chromosome rearrangement, not a gene's position.

Question 36 Biology

If 15 um size object is observed under light microscope using 5X eyepieces and 10X objective, its magnified image size will be:

- A. 250um
- B. 50um

um ✓ Correct answer

- D. 500um

A. 250 um would result from a magnification of about 16.7x, not 50x.

B. 50 um is the total magnification, not the image size.

C. Total magnification = 5 x 10 = 50x; image size = 15 um x 50 = 750 um.

D. 500 um would result from a magnification of about 33x, not 50x.

Question 37 Biology

Which one of the following is the cause of Severe Combined Immunodeficiency Disease (SCID)?

- A. Pancreatic Enzyme
- B. Adenosine Deaminase (ADA) ✓ **Correct answer**
- C. B-galactosidase
- D. B-lactamase

A. Pancreatic enzymes digest food; their absence does not cause SCID.

B. ADA deficiency is the classic cause of SCID (the 'bubble boy' disease).

C. Beta-galactosidase deficiency causes lysosomal storage disease, not SCID.

D. Beta-lactamase is a bacterial enzyme that breaks down penicillin, not a cause of SCID.

Question 38 Biology

Which one of the following changes in the gene pool of a population in a random manner?

- A. Natural selection
- B. Migration
- C. Mutation

netic drift ✓ **Correct answer**

A. Natural selection is non-random: it favours advantageous alleles.

B. Migration (gene flow) moves alleles between populations but is not random change within a gene pool.

C. Mutation creates new alleles randomly, but the question asks for the random change in allele frequencies.

D. Genetic drift is the random change in allele frequencies in a population.

Question 39 Biology

The finger like infoldings which are formed by inner membrane of mitochondria are called:

- A. Matrix
- B. Porin
- C. Cristae ✓ **Correct answer**
- D. Ribosomes

A. The matrix is the inner fluid of the mitochondrion, not its infoldings.

B. Porins are channel proteins in the outer membrane.

C. Cristae are the finger-like infoldings of the inner mitochondrial membrane.

D. Mitochondrial ribosomes are small particles in the matrix, not membrane folds.

Question 40 Biology

The main nitrogenous excretory product of humans is:

- A. Uric acid
- B. Ammonia
- C. Urea ✓ **Correct answer**

A. Uric acid is the main excretory product of birds and reptiles, not humans.

B. Ammonia is the main excretory product of aquatic animals; humans convert it to urea.

C. Humans are ureotelic: their main nitrogenous waste is urea.

D. Ammonium ions are a minor excretory form, not the main product.

Question 41 Biology

Excess amount of amino acid is converted into urea in liver. Urea is synthesized from:

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

A. Carbohydrates are broken down to glucose, not converted into urea.

B. Excess amino acids from proteins are deaminated in the liver; the ammonia formed is converted into urea.

C. Nucleic acids are broken down to uric acid, not urea.

D. Lipids are broken down to fatty acids and glycerol, not urea.

Question 42 Biology

Acetylcholine and Noradrenaline are two types of ___ used in our nervous system.

- A. Hormones
- B. Channel and carrier proteins in the cell membrane of a neuron
- C. Enzymes
- D. Neurotransmitters ✓ **Correct answer**

s are chemical messengers carried in blood, not synaptic transmitters.

B. Channel and carrier proteins move substances across membranes; they are not the transmitters.

C. Enzymes catalyse reactions; acetylcholine and noradrenaline are not enzymes.

D. Acetylcholine and noradrenaline are neurotransmitters that carry signals across synapses.

Question 43 Biology

The reflex action is the phenomena which only involves:

- A. brain, receptors, spinal cord
- B. receptors, effectors and spinal cord ✓ **Correct answer**
- C. receptors, neurons, brain
- D. receptors and effectors

A. The brain is not involved in a simple reflex arc.

B. A reflex action involves receptors, sensory and motor neurons, the spinal cord and effectors, but not the brain.

C. The brain is not part of the reflex arc.

D. Neurons are involved, but the full arc also needs the spinal cord.

Question 44 Biology

In which situation, Genes are not assorted independently during Meiosis in a chromosome?

- A. When genes are not linked and their loci are far apart.
- B. When there are too many Genes on a chromosome.
- C. When some genes have mutated on the chromosome.

…en genes are linked and their loci are close to each other ✓ **Correct answer**

A. Unlinked genes far apart assort independently, as Mendel's law states.

B. The number of genes on a chromosome does not prevent independent assortment.

C. Mutation changes alleles; it does not prevent independent assortment.

D. Linked genes close together on the same chromosome do not assort independently.

Question 45 Biology

A person got an infection, he became ill but then he survived. What do you think which type of immunity he would have developed?

- A. Naturally induced active immunity ✓ **Correct answer**
- B. Artificially induced active immunity
- C. Active immunity
- D. Passive immunity

A. Recovery from a natural infection gives naturally induced active immunity.

B. Artificially induced active immunity comes from vaccination, not from natural infection.

C. Active immunity is correct in general, but the natural route makes A the best answer.

D. Passive immunity is immunity received ready-made (e.g. antibodies from mother), not developed after infection.

Question 46 Biology

During spermatogenesis, the ___, which are haploid cells eventually mature into spermatozoa/mature sperms:

- A. Secondary spermatocytes
- B. Primary spermatocytes
- C. Spermatogonia

rmatids ✓ Correct answer

A. Secondary spermatocytes divide by meiosis II to give spermatids, not spermatozoa directly.

B. Primary spermatocytes divide by meiosis I to give secondary spermatocytes.

C. Spermatogonia divide by mitosis to give primary spermatocytes.

D. Spermatids are the haploid cells that differentiate (spermiogenesis) into mature spermatozoa.

Question 47 Biology

Transgenic mice have been used to produce:

- A. Protein rich milk
- B. A growth hormone ✓ **Correct answer**
- C. Protein rich meat
- D. Extra hair

A. Protein rich milk is produced by transgenic goats and cows in some systems, but the textbook example for mice is growth hormone.

B. Transgenic mice carrying the human growth hormone gene produce the hormone (the first transgenic animal, 1982).

C. Protein rich meat is not the product associated with transgenic mice.

D. Extra hair is not produced by transgenic mice. (Key: no Learnospot item exists for this question; answer B — a growth hormone — confirmed by ParhaiKrlo's MDCAT past-paper Biotechnology MCQs, which list this exact UHS question keyed B.)

Question 48 Biology

According to the theory of natural selection, organisms produce:

- e offspring than supported ✓ **Correct answer**
- B. Less offspring than supported
- C. Offspring according to the resources available
- D. Offspring to create resources

A. Natural selection rests on overproduction: organisms produce more offspring than the environment can support.

B. Organisms produce more, not fewer, offspring than can survive.

C. Offspring are produced in excess of resources, not matched to them.

D. Offspring are not produced to create resources.

Question 49 Biology

The photosynthetic pigments of plants are arranged as clusters in thylakoid membranes. The reaction centers of these clusters consist of ___ molecules

- A. ATP
- B. Chlorophyll ✓ **Correct answer**
- C. Glucose
- D. Carotenoids

A. ATP is the energy currency made by the light reactions, not the reaction centre molecule.

B. The reaction centres of photosystems consist of chlorophyll a molecules (P680 and P700).

C. Glucose is the end product of photosynthesis, not part of the reaction centre.

D. Carotenoids are accessory pigments that pass energy to the reaction centre.

50 Biology

Meselson and Stahl transferred few bacteria grown in N15 medium to N14 medium for replicating their DNA. What would be the result after two rounds of replication?

- A. 50% hybrid duplex and 50% light duplex ✓ **Correct answer**
- B. 50% hybrid duplex and 50% heavy duplex
- C. 100% heavy duplex
- D. 100% hybrid duplex

A. After two rounds, half the DNA is hybrid (14N/15N) and half is light (14N/14N).

B. No heavy (15N/15N) duplex remains after two rounds in 14N medium.

C. No 100% heavy duplex can remain after growth in light medium.

D. After one round all DNA is hybrid; the second round gives 50% hybrid and 50% light.

Question 51 Biology

In an action potential, the permeability of sodium ions in the neurons increases due to:

- A. Repolarization
- B. The opening of sodium channels/gates ✓ **Correct answer**
- C. The action of the acetylcholinesterase enzyme
- D. Sodium ions forming an ionic bonding

A. Repolarization follows depolarization and is caused by K+ leaving, not by Na+ entry.

B. Depolarization is caused by the opening of voltage-gated sodium channels, increasing Na+ permeability.

C. Acetylcholinesterase breaks down acetylcholine at synapses; it does not open Na+ channels.

D. Sodium ions do not form ionic bonds during an action potential.

52 Biology

During the G2 phase:

- A. Specific enzymes are synthesized and DNA base units are accumulated
- B. The chromosomes are left with only one chromatid
- C. Chromosome number is duplicated
- D. Energy is stored for Chromosome movement and mitotic specific proteins (Tubulin) are produced ✓ **Correct answer**

A. Specific enzymes are synthesized and DNA bases accumulated in G1, not G2.

B. Chromosomes are left with two chromatids after S phase; this is not a G2 event.

C. Chromosome number is duplicated during S phase, not G2.

D. In G2, energy is stored and tubulin and other mitotic proteins are produced for chromosome movement.

Question 53 Biology

Thin filaments of muscles contain ___ chains of actin molecules.

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

A. Thin filaments do not contain four actin chains.

B. A single chain does not make a thin filament.

C. Three chains is not the structure of a thin filament.

D. Each thin filament contains two intertwined chains of actin molecules.

54 Biology

Which cell organelle is responsible for cell secretion?

- A. Mitochondrion
- B. Chloroplast
- C. Ribosome
- D. Golgi body ✓ **Correct answer**

A. Mitochondria release energy by respiration; they do not secrete.

B. Chloroplasts carry out photosynthesis.

C. Ribosomes synthesise proteins.

D. The Golgi body modifies, packages and secretes proteins and other products.

Question 55 Biology

Most proteins are made up of:

- A. 16 types of Amino acids
- B. 10 types of Amino acids
- C. 170 types of Amino acids
- D. 20 types of Amino acids ✓ **Correct answer**

A. Only 20 amino acids are used to build proteins, not 16.

B. 10 is the number of essential amino acids, not the total used.

C. 170 amino acids are not used in protein synthesis.

D. Most proteins are built from 20 types of amino acids.

Question 56 Biology

A disease caused by gradual breakdown of the thin walls of alveoli is ___.

erculosis

- B. Asthma
- C. Emphysema ✓ **Correct answer**
- D. Bronchitis

A. Tuberculosis is a bacterial infection of the lungs, not breakdown of alveolar walls.

B. Asthma is narrowing of the airways, not breakdown of alveoli.

C. Emphysema is the gradual breakdown of alveolar walls, reducing gas exchange surface.

D. Bronchitis is inflammation of the bronchi, not breakdown of alveoli.

Question 57 Biology

If sequence in DNA is CCCTAGAG, then what would be the sequence in messenger RNA after transcription?

- A. GGGAUCUC ✓ **Correct answer**
- B. GGGATCTC
- C. GGGTCTC
- D. GGAAUCUC

A. The mRNA is complementary to the DNA template: CCCTAGAG gives GGGAUCUC (U in place of T).

B. GGGTCTC contains T, which never appears in RNA.

C. GGGTCTC is the DNA complement, not the RNA sequence.

D. GGAAUCUC does not complement CCCTAGAG.

Question 58 Biology

Taxonomy includes the arrangement of organisms into different taxa. Which of the following represents the correct hierarchy of various taxa of classification?

cies, genus, family, order, class, phylum ✓ **Correct answer**

- B. Order, family, class, phylum, kingdom
- C. Species, genus, order, family, class, phylum
- D. Species, genus, family, class, order, phylum

A. The correct hierarchy is species, genus, family, order, class, phylum (then kingdom).

B. This list starts at order and omits species and genus.

C. Family comes before order, not after it.

D. Class comes after order, not before it.

Question 59 Biology

Complementary DNA molecule is

- A. an artificial DNA
- B. single stranded DNA
- C. DNA from mRNA ✓ **Correct answer**
- D. a small segment of chromosomal DNA

A. cDNA is made in the laboratory, but 'artificial DNA' is not its definition.

B. cDNA is double stranded, not single stranded.

C. Complementary DNA (cDNA) is DNA synthesised from an mRNA template by reverse transcriptase.

D. cDNA is not a segment cut from a chromosome.

Question 60 Biology

Capsid, the protective coat of a virus is made up of ___ subunits known as capsomeres.

- A. Lipid
- B. Protein ✓ **Correct answer**

- D. DNA

A. Lipids form the viral envelope in some viruses, not the capsid.

B. The capsid is made of protein subunits (capsomeres).

C. RNA is the genetic material inside the capsid of RNA viruses.

D. DNA is the genetic material inside the capsid of DNA viruses.

Question 61 Biology

In plants, which sugar is transported from source to sink through sieve tubes?

- A. Fructose
- B. Sucrose ✓ **Correct answer**
- C. Glucose
- D. Starch

A. Fructose is transported in small amounts, not the main translocated sugar.

B. Sucrose is the sugar transported in sieve tubes from source to sink.

C. Glucose is used locally or stored, not the main transport sugar.

D. Starch is insoluble and stored, not transported in phloem.

Question 62 Biology

If a carrier haemophilic female (XH Xh) is married to a haemophilic male (Xh Y). What will be the ratio of presence of haemophilia in the children. Select best answer from given condition. XH Xh x Xh Y

- A. 100% all females and males will be haemophilic
- B. carrier female 25%, haemophilic female 25%, 25% normal male and 25% haemophilic male. ✓ **Correct answer**

- ales and males both have 50% chances of getting haemophilia
- D. females have 50% chances of getting haemophilia and males will be 100% haemophilic

A. Not all children are haemophilic: daughters can be carriers and sons can be normal.

B. XH Xh x Xh Y gives 25% carrier daughters, 25% haemophilic daughters, 25% normal sons, 25% haemophilic sons.

C. Each sex has a 50% chance of being affected only if the mother were normal; here the father is affected.

D. Males are not 100% haemophilic; half the sons receive the normal X from the mother.

Question 63 Biology

As a result of replication, parental DNA would become completely dispersed and that each strand of all the daughter molecules would be a mixture of old and new DNA. This is called as:

- A. Conservative idea
- B. Dispersive idea ✓ **Correct answer**
- C. Disruptive idea
- D. Semi-conservative idea

A. In the conservative idea the parental DNA stays intact in one daughter molecule.

B. The dispersive idea says parental DNA is dispersed so each strand is a mixture of old and new DNA.

C. There is no 'disruptive idea' in replication models.

D. In the semi-conservative idea each daughter molecule has one old and one new strand, not mixed strands.

64 Biology

A student of chemical engineering mistakenly engulfed the toxic compound "A" which was a potent inhibitor of certain enzyme. He was immediately brought to hospital where Dr. injected intravenously substrate "B" to minimize the toxic effect of compound A. His life was saved from serious damages. The treatment method shows that compound A was a ___ inhibitor.

- A. Temperature sensitive
- B. Competitive reversible ✓ **Correct answer**
- C. Irreversible
- D. Non-competitive reversible

A. Temperature sensitivity is not a class of enzyme inhibition.

B. The toxic compound was overcome by adding extra substrate, so it competed with the substrate: a competitive reversible inhibitor.

C. An irreversible inhibitor could not be overcome by adding substrate.

D. A non-competitive inhibitor binds elsewhere and is not overcome by extra substrate.

Question 65 Biology

Four plants are present in different environmental conditions. Plant A is present in warm climate with continuous rainfall, plant B is present in a cool forest, plant C is present in warm climate with little breeze while plant D is present in warm climate with high wind speed. Which one of the above plants will have highest rate of transpiration?

- A. Plant B
- B. Plant D ✓ **Correct answer**
- C. Plant C
- D. Plant A

A. Plant B is in a cool forest, so transpiration is low.

in a warm climate with high wind speed, which removes water vapour fastest and gives the highest transpiration rate.

C. Plant C has little breeze, so water vapour accumulates and transpiration is slower.

D. Plant A has continuous rainfall and high humidity, which reduces transpiration.

Question 66 Biology

Sequence of amino acids in a polypeptide chain of protein molecule corresponds to the sequence of nucleotides on mRNA for that protein. If reading frame of mRNA for a human protein is 993 nucleotide including a stop codon at the end, how many amino acids would be incorporated in the polypeptide chain?

- A. 331
- B. 993
- C. 93
- D. 330 ✓ **Correct answer**

A. 331 is the number of codons including the stop codon, not the amino acids.

B. 993 is the number of nucleotides, not amino acids.

C. 93 is not the number of amino acids in this protein.

D. 993 nucleotides give 331 codons; minus the stop codon, 330 amino acids are incorporated.

Question 67 Biology

The major function of Basophils is to:

- A. Destroy small particles by phagocytosis
- B. Release heparin to prevent blood clotting ✓ **Correct answer**
- C. Inactivate inflammation producing substances
- D. Transport oxygen

ils, not basophils, destroy particles by phagocytosis.

B. Basophils release heparin, which prevents blood clotting, and histamine.

C. Basophils release inflammation-producing substances rather than inactivating them.

D. Red blood cells, not basophils, transport oxygen.

Question 68 Biology

Large lymph vessels ultimately form larger lymph duct, which drains its lymph into:

- A. Carotid and Aorta
- B. Vena Cava and Aorta
- C. Subclavian Vein ✓ **Correct answer**
- D. Subclavian Artery

A. The carotid artery and aorta carry blood, not lymph.

B. The vena cava and aorta are blood vessels, not lymph drains.

C. The large lymph ducts drain into the subclavian veins.

D. The subclavian artery carries blood away from the heart; lymph drains into the vein.

Question 69 Biology

Blood group AB is an example of ___.

- A. Complete dominance
- B. Recessive alleles
- C. Incomplete dominance
- D. Co-dominance ✓ **Correct answer**

A. Complete dominance means one allele masks the other; AB shows both alleles.

B. Recessive alleles are masked in heterozygotes; both A and B are expressed here.

e dominance gives an intermediate trait, not both traits fully expressed.

D. In blood group AB both the A and B alleles are expressed: co-dominance.

Question 70 Biology

Passive processes for the movement of molecules across cell surface membrane are:

- A. facilitated diffusion and osmosis ✓ **Correct answer**
- B. pinocytosis and facilitated diffusion
- C. diffusion and exocytosis
- D. osmosis and phagocytosis

A. Facilitated diffusion and osmosis both move molecules down a gradient without energy.

B. Pinocytosis is an active, energy-using process.

C. Exocytosis is an active process requiring energy.

D. Phagocytosis is an active process requiring energy.

Question 71 Biology

In glycine R is ___.

- A. fatty acid
- B. ethane
- C. hydrogen ✓ **Correct answer**
- D. methane

A. A fatty acid is a long hydrocarbon chain, not the R group of glycine.

B. Ethane is a two-carbon hydrocarbon, not glycine's R group.

C. In glycine the R group is a single hydrogen atom.

s CH_4, not the R group of glycine.

Question 72 Biology

Glycolysis takes place in the ___ of cell.

- A. Golgi complex
- B. Nucleus
- C. Cytoplasm ✓ **Correct answer**
- D. Mitochondria

A. The Golgi complex modifies and packages proteins, not glycolysis.

B. The nucleus contains DNA; glycolysis is not nuclear.

C. Glycolysis takes place in the cytoplasm of the cell.

D. Mitochondria carry out the Krebs cycle and oxidative phosphorylation.

Question 73 Biology

Lipids contain double amount of energy as compared to the same amount of carbohydrates due to the presence of:

- A. Lower proportion of C-H bonds
- B. Higher proportion of C-H bonds ✓ **Correct answer**
- C. Higher proportion of C-O bonds
- D. Higher proportion of Oxygen

A. Lipids have a higher, not lower, proportion of C-H bonds than carbohydrates.

B. Lipids are rich in C-H bonds, whose oxidation releases more energy than C-O bonds.

C. Lipids have a lower proportion of C-O bonds than carbohydrates.

D. Lipids contain less oxygen, not more, than carbohydrates.

74 Biology

If water has high latent heat of vapourisation, how this property of water could be helpful to plants and animals?

- A. With the release of large amount of water vapours, a small amount of heat loss can take place.
- B. No cooling effect with the release of even large amount of water vapours.
- C. It will keep their temperature very high.
- D. With the release of small amount of water vapours, a great amount of heat loss can take place. ✓ **Correct answer**

A. A small amount of heat is lost when a large amount of vapour is released only if the latent heat is low.

B. Evaporation of water does cool the body: it carries away a large amount of heat.

C. High latent heat keeps temperature stable, not very high.

D. Because the latent heat is high, evaporating even a small amount of water removes a great amount of heat.

Question 75 Biology

How many molecules of ATP would be utilized for phosphorylation of one glucose molecule during glycolysis?

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

A. Two ATP are used in the investment phase, not one.

B. Four ATP are produced in glycolysis, but only two are used for phosphorylation.

re used: one by hexokinase and one by phosphofructokinase.

D. Three ATP are not used in glycolysis.

Question 76 Biology

Among followings, ___ enzyme is naturally found in human immunodeficiency virus (HIV).

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

A. DNA polymerase is a host enzyme, not an HIV enzyme.

B. RNA polymerase is a host enzyme, not an HIV enzyme.

C. HIV carries reverse transcriptase, which copies its RNA into DNA.

D. Ligase joins DNA fragments; it is not the characteristic HIV enzyme.

Question 77 Biology

The structure of a fibrous protein comprises of polypeptide chains in the form of:

- A. Cluster
- B. Flat uncoiled chains
- C. Spherical or curled up ball
- D. Long strands or fibrils ✓ **Correct answer**

A. A cluster describes globular proteins, not fibrous proteins.

B. Fibrous proteins are not flat uncoiled chains.

C. A spherical or curled-up ball describes globular proteins.

D. Fibrous proteins consist of long polypeptide strands or fibrils.

78 Biology

Which is an example of a Disaccharide:

- A. Lactose ✓ **Correct answer**
- B. Glycogen
- C. Starch
- D. Fructose

A. Lactose (glucose + galactose) is a disaccharide.

B. Glycogen is a polysaccharide.

C. Starch is a polysaccharide.

D. Fructose is a monosaccharide.

Question 79 Biology

Which one is an example of a Nucleotide?

- A. Adenosine
- B. ATP ✓ **Correct answer**
- C. Guanine
- D. NAD

A. Adenosine is a nucleoside (base + sugar), lacking the phosphate of a nucleotide.

B. ATP (adenosine triphosphate) is a nucleotide: base + sugar + phosphate.

C. Guanine is a nitrogenous base, not a nucleotide.

D. NAD is a coenzyme dinucleotide, not a single nucleotide.

Question 80 Biology

Which of the following photosystem is involved in cyclic photophosphorylation?

and PS II

- B. PS II
- C. PS III
- D. PS I ✓ **Correct answer**

A. Both photosystems are used in non-cyclic photophosphorylation.

B. PS II alone drives non-cyclic flow; cyclic flow uses only PS I.

C. There is no photosystem III.

D. Cyclic photophosphorylation involves only photosystem I.

Question 81 Chemistry

Which product is obtained by the hydrolysis of 1- chlorobutane with the aqueous sodium hydroxide?

- A. 1-butanol ✓ **Correct answer**
- B. 1- butene
- C. Butanone
- D. 1- butanal

A. Aqueous NaOH hydrolyses 1-chlorobutane by nucleophilic substitution, giving butan-1-ol.

B. 1-butene forms with alcoholic KOH (elimination), not aqueous NaOH.

C. Butanone is a ketone; it is not formed by hydrolysis of an alkyl halide.

D. 1-butanal is an aldehyde; it is not formed by hydrolysis of an alkyl halide.

Question 82 Chemistry

Treatment of ethene with cold sulphuric acid followed by reaction with boiling water yields:

- B. Ethyne
- C. Ethanal
- D. Ethanol ✓ **Correct answer**

A. Ethane is the saturated hydrocarbon; it is not formed by this hydration.

B. Ethyne is an alkyne, not a product of ethene hydration.

C. Ethanal is formed by hydration of ethyne, not ethene.

D. Ethene adds water (via ethyl hydrogen sulfate) to give ethanol.

Question 83 Chemistry

The average atomic mass of Boron is 10.8. It has two isotopes of masses 10 and 11 respectively. What is the percentage of isotope with the average mass of 10?

- A. 20% ✓ **Correct answer**
- B. 50%
- C. 60%
- D. 80%

A. Let x% be the mass-10 isotope: 10x + 11(100 - x) = 1080, so x = 20%.

B. 50% would give an average of 10.5, not 10.8.

C. 60% would give an average of 10.4, not 10.8.

D. 80% is the percentage of the mass-11 isotope, not the mass-10 isotope.

Question 84 Chemistry

In contact process, to which substance adequate quantities of water is added to convert it to sulphuric acid?

- A. SO_3

- C. SO2
- D. HSO4-

A. SO3 is not dissolved directly in water (it forms a mist); it is first absorbed in concentrated acid to make oleum.

B. Water is added to oleum (H2S2O7) to give 2H2SO4; this is the safe dilution step of the contact process.

C. SO2 is oxidised to SO3, not hydrated to sulfuric acid.

D. HSO4- is the hydrogensulfate ion, not the substance diluted in this step.

Question 85 Chemistry

Which of the equations shows the same "twice" the enthaply change of neutralization as the following equation: HCl + NaOH -> NaCl + H2O

- A. NH4Cl + NaOH -> NaCl + H2O + NH3
- B. MgCO3 + 2HCl -> MgCl2 + CO2 + H2O
- C. KOH + HCl -> KCl + H2O
- D. H2SO4 + Mg(OH)2 -> MgSO4 + 2H2O ✓ **Correct answer**

A. NH4Cl + NaOH gives one mole of water and releases NH3; its enthalpy is not twice the given value.

B. MgCO3 + 2HCl gives one mole of water and CO2; its enthalpy is not twice the given value.

C. KOH + HCl gives one mole of water, the same enthalpy as the given equation.

D. H2SO4 + Mg(OH)2 gives two moles of water, so its enthalpy change is twice that of the given equation.

86 Chemistry

The decomposition of phosphorus pentachloride in the presence of moisture takes place by the following mechanism: PCl5 (s) + H2O (l) -> POCl3 (l) + 2HCl (aq) (Slow Step); POCl3 (l) + 3H2O (l) -> H3PO4 (l) + 3HCl (aq) (Fast Step). The rate equation for this reaction will be:

- A. Rate = k [PCl5][H2O] ✓ **Correct answer**
- B. Rate = [PCl5][H2O]
- C. Rate = k [POCl3][H2O]3
- D. Rate = k [PCl5][H2O]4

A. The rate is set by the slow step, PCl5 + H2O, so rate = k[PCl5][H2O].

B. A rate equation must include the rate constant k.

C. POCl3 is an intermediate of the fast step; it does not appear in the rate equation.

D. The overall stoichiometry does not set the rate; the slow step gives first order in each reactant.

Question 87 Chemistry

The names of functional groups in the following compound X are; [Structure: a benzene ring bearing a -CH(OH)CH3 group and a -CH2CN group.]

- A. Primary alcohol, nitrile and benzene ring
- B. Secondary alcohol, nitrile and phenol ring
- C. Secondary alcohol, amine and benzene ring
- D. Secondary alcohol, nitrile and aryl ring ✓ **Correct answer**

A. The alcohol carbon is attached to two carbons, so it is secondary, not primary.

B. The ring is a benzene (aryl) ring, not a phenol ring (there is no -OH on the ring).

C. The -CH2CN group is a nitrile, not an amine.

ound has a secondary alcohol, a nitrile group and an aryl (benzene) ring.

Question 88 Chemistry

If the energy of activation of a chemical reaction is very low, the rate of that chemical reaction is observed to be very high because?

- A. Reaction proceeds without any transition state
- B. Number of efficient or fruitful collisions increase ✓ **Correct answer**
- C. Concentration of the reactants becomes irrelevant
- D. Molecules of the reactants move slowly

A. A transition state still forms; a low activation energy does not remove it.

B. With a low energy barrier, more collisions have enough energy to react, so fruitful collisions increase and the rate is high.

C. Concentration still affects the rate; it does not become irrelevant.

D. Molecules move faster, not slower, when the reaction is fast.

Question 89 Chemistry

Which of the following compounds will give a secondary alcohol after reaction with NaBH4?

- A. CH3COOCH3
- B. CH3COCH3 ✓ **Correct answer**
- C. CH3CH2COOH
- D. CH3CH2CHO

A. An ester is reduced by NaBH4 to a primary alcohol, not a secondary alcohol.

B. Propanone (a ketone) is reduced by NaBH4 to propan-2-ol, a secondary alcohol.

C. A carboxylic acid is reduced by NaBH4 to a primary alcohol.

de is reduced by NaBH4 to a primary alcohol.

Question 90 Chemistry

Copper is a typical transition metal. Its atomic number is 29. In which oxidation state does it have partially filled orbital in d-subshell?

- A. Cu2+ ✓ **Correct answer**
- B. Cu-
- C. Cu
- D. Cu+

A. Cu2+ is 3d9, with a partially filled d-subshell.

B. Cu- would be 3d10 4s2, with a filled d-subshell.

C. Cu is 3d10 4s1, with a filled d-subshell.

D. Cu+ is 3d10, with a filled d-subshell.

Question 91 Chemistry

Which of the following reagent is required for preparation of acyl chloride (CH3COCl) from ethanoic acid?

- A. POCl3
- B. HCl
- C. PCl5 ✓ **Correct answer**
- D. CH3Cl

A. POCl3 is a by-product of the reaction with PCl5, not the reagent used.

B. HCl is a product of the reaction, not the reagent.

C. PCl5 converts ethanoic acid into ethanoyl chloride (CH3COCl).

D. CH3Cl is methyl chloride, not a reagent for making acyl chlorides.

92 Chemistry

The given diagram shows the enthalpy changes during a chemical reaction. [Diagram: enthalpy increases upward; Reactants at H1 (higher level), Products at H2 (lower level), with an arrow down from reactants to products.] This diagram represents:

- A. A non-spontaneous process
- B. An isothermic process
- C. An endothermic reaction
- D. An exothermic reaction ✓ **Correct answer**

A. The diagram shows an energy change, so the process is not described as non-spontaneous on this evidence.

B. The diagram does not show constant temperature; it shows an enthalpy drop.

C. In an endothermic reaction the products are higher in energy than the reactants; here they are lower.

D. The products lie lower in enthalpy than the reactants (H2 < H1), so heat is released: an exothermic reaction.

Note: Filed option B read "An isothermio process" (misprint in the source reproduction); corrected to "An isothermic process" as documented in the reviewed file.

Question 93 Chemistry

Ionization energy decreases down the group from top to bottom due to:

- A. Increase in proton number
- B. Decrease in atomic size
- C. Increase in shielding effect of the intervening electrons ✓ **Correct answer**
- D. Increase in atomic mass

A. Increasing proton number would increase nuclear attraction and raise ionization energy.

e increases down a group, which lowers ionization energy; a decrease would raise it.

C. Down a group, extra shells shield the outer electron from the nucleus, so it is removed more easily.

D. Atomic mass increases down a group, but mass itself does not determine ionization energy.

Question 94 Chemistry

Free Nitrogen and oxygen are present in atmosphere but they do not react with each other under normal conditions, because:

- A. Oxygen is found in less concentration.
- B. Nitrogen requires a catalyst.
- C. Nitrogen is highly inactive gas. ✓ **Correct answer**
- D. Oxygen is very inactive.

A. Oxygen is about 21% of air, ample for reaction if nitrogen were reactive.

B. Nitrogen needs no catalyst; its unreactivity is due to its strong triple bond.

C. Nitrogen's very strong N-N triple bond makes it highly inactive under normal conditions.

D. Oxygen is reactive; it is nitrogen that is inactive.

Question 95 Chemistry

Which derivative of benzene shows maximum reactivity in electrophilic substitution reactions?

- A. Benzoic acid
- B. Benzaldehyde
- C. Nitrobenzene

:hyl benzene ✓ **Correct answer**

A. The -COOH group deactivates the ring towards electrophilic substitution.

B. The -CHO group deactivates the ring.

C. The -NO2 group strongly deactivates the ring.

D. The methyl group activates the ring (toluene), so it is the most reactive of the four.

Question 96 Chemistry

Which of the following reactions is used for the production of alcohols on industrial scale?

- A. Hydrogenation of alkenes
- B. Hydroxylation of alkenes
- C. Hydrohalogenation of alkenes
- D. Hydration of alkenes ✓ **Correct answer**

A. Hydrogenation of alkenes gives alkanes, not alcohols.

B. Hydroxylation gives diols, not the industrial route to simple alcohols.

C. Hydrohalogenation gives alkyl halides, not alcohols.

D. Hydration of alkenes (e.g. ethene with steam) is the industrial route to alcohols.

Question 97 Chemistry

The pH of 10-2 M aqueous solution of sodium hydroxide is

- A. 12 ✓ **Correct answer**
- B. 10
- C. 13
- D. 14

-2 M, so pOH = 2 and pH = 14 - 2 = 12.

B. 10 would be the pH of a 10-4 M NaOH solution.

C. 13 would be the pH of a 10-1 M NaOH solution.

D. 14 is the pH of a 1 M NaOH solution.

Question 98 Chemistry

In the reaction sequence: H3C-CH2-CH2-Br + Alc KOH -> C; C --H2SO4/H2O--> D. Product D will be

- A. 2-propanol ✓ **Correct answer**
- B. 1-propanol
- C. Propanoic acid
- D. Mixture of methanol and ethanol

A. 1-bromopropane with alcoholic KOH gives propene; hydration with H2SO4/H2O (Markovnikov) gives propan-2-ol.

B. 1-propanol would form by anti-Markovnikov addition, which does not occur here.

C. Propanoic acid would require oxidation, not hydration of propene.

D. No methanol or ethanol is formed in this sequence.

Question 99 Chemistry

What is the measure of activation energy in an endothermic reaction?

- A. The energy of activation of forward reaction is less than that of backward reaction.
- B. The energy of activation of forward-backward reaction is same.
- C. The energy of activation of backward reaction is less than that of forward reaction. ✓ **Correct answer**

energy of activation of backward reaction is more than that of forward reaction.

A. In an endothermic reaction Ea(forward) is greater than Ea(backward), not less.

B. The forward and backward activation energies differ by the enthalpy change.

C. For an endothermic reaction, Ea(backward) = Ea(forward) - dH, so it is less than Ea(forward).

D. The backward activation energy is less, not more, than the forward one.

Question 100 Chemistry

Maleic acid and Fumaric acid, both have chemical formula C4H4O4. The structure of these acids is shown below. [Maleic acid: the two -COOH groups on the same side of the C=C bond (cis). Fumaric acid: the two -COOH groups on opposite sides (trans).] Maleic acid and Fumaric acid are:

- A. Position isomers
- B. Structural isomers
- C. Metamers
- D. Cis-trans isomers ✓ **Correct answer**

A. Position isomers differ in the position of a functional group; maleic and fumaric acids have the same connectivity.

B. They are not structural isomers: both have the same C4H4O4 skeleton.

C. Metamers differ in the groups on either side of a functional group; this is not the case here.

D. Maleic acid is the cis isomer and fumaric acid the trans isomer about the C=C bond.

101 Chemistry

Alkenes undergo:

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

A. Alkenes do not undergo nucleophilic substitution; the pi bond attracts electrophiles.

B. Alkenes undergo electrophilic, not nucleophilic, addition.

C. The pi bond of an alkene is attacked by an electrophile, followed by addition: electrophilic addition.

D. Alkenes do not undergo electrophilic substitution (that is typical of benzene).

Question 102 Chemistry

Nitriles (RCN) on hydrolysis in the presence of a mineral acid yield:

- A. Ethers
- B. Carboxylic acids ✓ **Correct answer**
- C. Aldehydes
- D. Alcohols

A. Ethers are not formed by hydrolysis of nitriles.

B. Acid hydrolysis of a nitrile (RCN) gives the carboxylic acid RCOOH.

C. Aldehydes are formed by partial reduction of nitriles, not by hydrolysis.

D. Alcohols are not formed by hydrolysis of nitriles.

103 Chemistry

The Ka values of HCl, CH3COOH, HF and H2SO4 are 10+7, 1.85 x 10-5, 6.7 x 10-5 and 10+2 respectively. The decreasing order of acidic strength is:

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

A. This order puts HF above H2SO4, but Ka(H2SO4) = 10+2 is far larger than Ka(HF) = 6.7 x 10-5.

B. This order puts CH3COOH above HF and H2SO4, but its Ka is the smallest.

C. Ka values: HCl 10+7 > H2SO4 10+2 > HF 6.7 x 10-5 > CH3COOH 1.85 x 10-5.

D. This order is the reverse of the correct decreasing order.

Question 104 Chemistry

Which of the following will give a positive test with Tollen's reagent?

- A. Aldehydes ✓ **Correct answer**
- B. Tertiary Alcohols
- C. Ketones
- D. Carboxylic Acids

A. Aldehydes are oxidised by Tollen's reagent, giving a silver mirror: a positive test.

B. Tertiary alcohols are not oxidised by Tollen's reagent.

C. Ketones are not oxidised by Tollen's reagent (except alpha-hydroxy ketones).

D. Carboxylic acids do not give a positive Tollen's test.

105 Chemistry

Select the reagent X from the following choices for this conversion; CH3CH(OH)CH(CH3)2 --Reagent X--> CH3COCH(CH3)2

- A. Acidified Phosphoric acid
- B. Acidified Oxalic acid
- C. Acidified Potassium hydroxide
- D. Acidified Potassium dichromate (VI) ✓ **Correct answer**

A. Phosphoric acid is not an oxidising agent for secondary alcohols.

B. Oxalic acid is not used to oxidise secondary alcohols to ketones.

C. Potassium hydroxide is a base, not an oxidising agent.

D. Acidified potassium dichromate(VI) oxidises a secondary alcohol to a ketone.

Question 106 Chemistry

which of following compounds is responsible for the depletion of ozone layer?

- A. Carbon tetrachloride
- B. Chlorofluorocarbons ✓ **Correct answer**
- C. Hydrofluorocarbons
- D. Methane

A. Carbon tetrachloride is a solvent; it is not the main ozone-depleting compound.

B. Chlorofluorocarbons release chlorine radicals in the stratosphere that destroy ozone.

C. Hydrofluorocarbons contain no chlorine and do not deplete ozone.

D. Methane is a greenhouse gas, not the main cause of ozone depletion.

107 Chemistry

Which one the following compound is additional polymer?

- A. Carbohydrate
- B. Polyvinyl chloride ✓ **Correct answer**
- C. Nylon
- D. Polyester

A. Carbohydrates are natural condensation polymers, not addition polymers.

B. Polyvinyl chloride is made by addition polymerisation of vinyl chloride.

C. Nylon is a condensation polymer.

D. Polyester is a condensation polymer.

Question 108 Chemistry

Ketones can be made by oxidation of

- A. Secondary Alcohols ✓ **Correct answer**
- B. Tertiary Alcohols
- C. Aldehydes
- D. Primary Alcohols

A. Oxidation of a secondary alcohol gives a ketone.

B. Tertiary alcohols resist oxidation (no hydrogen on the carbon bearing -OH).

C. Oxidation of an aldehyde gives a carboxylic acid.

D. Oxidation of a primary alcohol gives an aldehyde and then a carboxylic acid.

Question 109 Chemistry

Which of the following bond is responsible for joining the amino acids in proteins?

c Bond

- B. Metallic Bond
- C. Di sulfide bond
- D. peptide Bond ✓ **Correct answer**

A. Ionic bonds hold oppositely charged ions together, not amino acids in a chain.

B. Metallic bonds occur between metal atoms, not between amino acids.

C. Disulfide bonds link cysteine residues in the folded protein, not the backbone amino acids.

D. Amino acids are joined by peptide bonds (-CO-NH-) in a protein chain.

Question 110 Chemistry

Identification tests for functional groups of organic compounds are based on specific observations. Tollen's reagent is ammonical silver nitrate solution, which is used for the identification of a functional group X with an observation O. Identify X and O.

- A. X= Ketone O= grey precipitate
- B. X= Ketone O= Silver mirror
- C. X=Aldehyde O= Silver mirror ✓ **Correct answer**
- D. X= Aldehyde O= red precipitate

A. Ketones do not react with Tollen's reagent, and no grey precipitate is the observation.

B. Ketones do not give a silver mirror with Tollen's reagent.

C. Tollen's reagent identifies aldehydes, which reduce Ag+ to a silver mirror.

D. A red precipitate is the Fehling's test observation, not Tollen's.

Question 111 Chemistry

The structure of Xenon trioxide is shown below, [Structure: Xe with three double bonds

e lone pair on top.] With reference to the Valence shell electron pair repulsion theory, (VSEPR), the shape of XeO3 is;

- A. Trigonal pyramidal ✓ **Correct answer**
- B. Tetrahedral
- C. Bent (or angular)
- D. Trigonal planar

A. XeO3 has three bond pairs and one lone pair, giving a trigonal pyramidal shape.

B. Tetrahedral shape needs four bond pairs and no lone pair.

C. A bent shape has two bond pairs; XeO3 has three.

D. Trigonal planar needs three bond pairs and no lone pair.

Question 112 Chemistry

Which two elements are isotopes? [Each option gives a pair in the form mass number / atomic number.]

- A. 18/9X and 20/10Y
- B. 14/8X and 15/8Y ✓ **Correct answer**
- C. 16/8X and 16/8Y
- D. 12/6X and 12/7Y

A. Different elements (different atomic numbers 9 and 10) cannot be isotopes.

B. Both have atomic number 8 (oxygen) with mass numbers 14 and 15: isotopes.

C. Same mass and same atomic number means the same species, not isotopes.

D. Different atomic numbers (6 and 7) means different elements, not isotopes.

Question 113 Chemistry

According to Watson and Crick's model of DNA, the DNA molecule consists of a double

type of forces are responsible to keep two strands of DNA together?

- A. Hydrogen bonding ✓ **Correct answer**
- B. Dipole-induces dipole forces
- C. van der Waal's forces
- D. Ionic bonding

A. The two DNA strands are held together by hydrogen bonds between complementary base pairs.

B. Dipole-induced dipole forces are weak dispersion forces, not the main strand-holding force.

C. Van der Waals forces contribute, but hydrogen bonding is the force that holds the strands together.

D. The strands are not held by ionic bonds.

Question 114 Chemistry

An inter molecular force of attraction X is relatively stronger than the other inter molecular forces, it stabilizes a-helix and b-pleated sheets of proteins. The double helical structure of DNA is also stabilized by this force of attraction. Identify X.

- A. Hydrogen bonding ✓ **Correct answer**
- B. van der Waal's Forces
- C. Ionic interactions
- D. Dipole dipole attraction

A. Hydrogen bonding stabilises alpha-helices, beta-pleated sheets and the DNA double helix.

B. Van der Waals forces are much weaker than hydrogen bonds.

C. Ionic interactions are not the main stabilising force in these structures.

pole attraction is weaker than hydrogen bonding.

Question 115 Chemistry

Which one of the following molecules has SP3 hybridization?

- A. CH4 ✓ **Correct answer**
- B. C2H2
- C. CO2
- D. C2H4

A. CH4 has four single bonds and four electron pairs around carbon: sp3 hybridisation.

B. C2H2 (ethyne) is sp hybridised.

C. CO2 is sp hybridised (linear).

D. C2H4 (ethene) is sp2 hybridised.

Question 116 Chemistry

Oxidation number of particular element can be directly or indirectly inferred from its:

- A. Atomic mass
- B. Physical state
- C. Group number ✓ **Correct answer**
- D. Atomic size

A. Atomic mass does not determine the oxidation number.

B. Physical state does not determine the oxidation number.

C. The group number gives the number of valence electrons, from which the oxidation number is inferred.

D. Atomic size does not determine the oxidation number.

117 Chemistry

Which of the following sets constitutes of all the molecules and ions of non-planar geometry?

- A. PH4+, NH3, SO3, Benzene
- B. CH triple bond CH, H2O, BeCl2, H2S
- C. SO2, C2H4, BF3, NO3-
- D. CH4, NH4+, MnO4-, NF3 ✓ **Correct answer**

A. SO3 and benzene are planar, so this set is not all non-planar.

B. CH triple bond CH and BeCl2 are linear (planar), so this set is not all non-planar.

C. C2H4, BF3 and NO3- are planar, so this set is not all non-planar.

D. CH4, NH4+, MnO4- (all tetrahedral) and NF3 (pyramidal) are all non-planar.

Question 118 Chemistry

Nitrogen has the atomic mass of 7. Which of the following electronic configurations is of a Nitrogen atom in ground state?

- A. 1s2,2s2,2px2,2py1
- B. 1s2,2s2,2px2,2pz1
- C. 1s2,2s2,2px1,2py1,2pz1 ✓ **Correct answer**
- D. 1s2,2s2,2py2,2pz1

A. 2px2 violates Hund's rule: the three p orbitals must be singly filled first.

B. 2px2 again puts two electrons in one p orbital before the others are singly filled.

C. Nitrogen (atomic number 7) in the ground state is 1s2, 2s2, 2px1, 2py1, 2pz1, following Hund's rule.

D. 2py2 violates Hund's rule. (Note: the stem prints "atomic mass of 7" — a misprint for atomic number 7. The answer C stands.)

119 Chemistry

CFC's are organic compounds, which are derivatives of saturated hydrocarbons. They have high bond dissociation values therefore they are inert and non toxic for the living organisms. The word CFC's stands for;

- A. Chlorofluoridecarbons
- B. Carboflourochlorines
- C. Chlorofluorcarbides
- D. Chlorofluorocarbons ✓ **Correct answer**

A. Chlorofluoridecarbons is not the name of CFCs.

B. Carboflourochlorines is not the name of CFCs.

C. Chlorofluorcarbides is not the name of CFCs.

D. CFC stands for chlorofluorocarbons.

Question 120 Chemistry

Amino acids are bi-functional compounds, with a general formula NH2CH(R)CO2H. A tripeptide is formed between Alanine (ala), Glycine (gly) and lysine (lys). There is no repetition of amino acid in this tri-peptide, suggest how many tri-peptides are possible?

- A. 9
- B. 3
- C. 6 ✓ **Correct answer**
- D. 12

A. 9 would allow repetition, which the question excludes.

B. 3 counts only the choices for one position, not all arrangements.

C. Three different amino acids can be arranged in 3! = 6 different tripeptides.

D. 12 would be 3 x 4, which does not count the permutations correctly.

121 Chemistry

Which type of reaction takes place when a carbonyl compound is treated with a mixture of NaCN and an acid?

- A. Substitution reaction
- B. Electrophilic addition reaction
- C. Nucleophilic addition reaction ✓ **Correct answer**
- D. Displacement reaction

A. Substitution does not occur here; the cyanide adds to the carbonyl carbon.

B. The carbonyl carbon is attacked by a nucleophile (CN-), not by an electrophile.

C. HCN adds across the C=O bond: cyanide attacks the carbonyl carbon, giving a cyanohydrin (nucleophilic addition).

D. Displacement is not the mechanism of cyanohydrin formation.

Question 122 Chemistry

Disposable cups are made of a polymer polystyrene. Polystyrene is:

- A. A polyamide
- B. A condensation polymer
- C. An addition polymer ✓ **Correct answer**
- D. A polyester

A. A polyamide is a condensation polymer (e.g. nylon).

B. Polystyrene is not a condensation polymer.

C. Polystyrene is made by addition polymerisation of styrene.

D. A polyester is a condensation polymer.

123 Chemistry

During stoichiometric calculations, which of the following laws must be followed?

- A. Dalton's law
- B. Law of conservation of mass ✓ **Correct answer**
- C. Avogadro's law
- D. Law of conservation of energy

A. Dalton's law concerns partial pressures of gases, not stoichiometry.

B. Stoichiometric calculations must obey the law of conservation of mass: atoms are neither created nor destroyed.

C. Avogadro's law relates gas volume and moles, not stoichiometry in general.

D. Energy conservation is a separate law; mass balance governs stoichiometry.

Question 124 Chemistry

Which of the following element is not present in halogens?

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

A. Cl (chlorine) is a halogen.

B. I (iodine) is a halogen.

C. F (fluorine) is a halogen.

D. Fe (iron) is a transition metal, not a halogen.

125 Chemistry

Which enthalpy change is relevant in the following process: Na(s) -> Na(g) dH = +

- A. Enthalpy of atomization ✓ **Correct answer**
- B. Enthalpy of vaporization
- C. Enthalpy of fusion
- D. Enthalpy of formation

A. Na(s) -> Na(g) is the conversion of the element into gaseous atoms: the enthalpy of atomization.

B. Enthalpy of vaporization is for liquid to gas, not solid to gas atoms.

C. Enthalpy of fusion is for solid to liquid.

D. Enthalpy of formation is for forming a compound from its elements.

Question 126 Chemistry

Which of the following substances exhibits hydrogen bonding?

- A. HI
- B. H2S
- C. SiH4
- D. NH3 ✓ **Correct answer**

A. HI has hydrogen bonded to iodine, which is not electronegative enough for hydrogen bonding.

B. H2S has hydrogen bonded to sulfur, which does not form hydrogen bonds.

C. SiH4 has no highly electronegative atom attached to hydrogen.

D. NH3 has hydrogen bonded to nitrogen, which forms hydrogen bonds.

127 Chemistry

Which balanced chemical equation show the formation of ethanoyl chloride using thionyl chloride?

- A. CH3COOH + SOCl2 -> CH3COCl + SO2 + HCl ✓ **Correct answer**
- B. CH3CH2COOH + 2SOCl -> CH3CH2COCl + SO2 + HCl
- C. CH3CH2COOH + 2SOCl -> CH3CH2COCl + SO3 + HCl
- D. HCOOH + SOCl2 -> HCOCl + SO2 + HCl

A. CH3COOH + SOCl2 -> CH3COCl + SO2 + HCl is the balanced formation of ethanoyl chloride.

B. The equation is unbalanced (2SOCl on the left but only one Cl in the products).

C. SO3 is not a product of this reaction, and the equation is unbalanced.

D. HCOOH gives methanoyl chloride, not ethanoyl chloride.

Question 128 Chemistry

The number of moles of water in 1Kg ice are

- A. 100 moles
- B. 1000 moles
- C. 50 moles
- D. 55.5 moles ✓ **Correct answer**

A. 100 moles would require 1800 g of water.

B. 1000 moles would require 18 kg of water.

C. 50 moles would be 900 g of water.

D. 1000 g / 18 g per mol = 55.5 moles.

129 Chemistry

For an equilibrium reaction; 2SO2(g) + O2(g) <=> 2SO3(g) the forward reaction is exothermic, increase in temperature shifts the equilibrium position towards left because,

- A. the concentrations of SO2 and O2 decrease and concentration of SO3 increases as the temperature increases
- B. the concentrations of SO2 and O2 increase and concentration of SO3 decreases as the temperature increases ✓ **Correct answer**
- C. the concentrations of SO2 and O2 increase and concentration of SO3 stays same as the temperature increases
- D. the concentrations of SO3, SO2 and O2 increase as the temperature increases

A. Heating an exothermic forward reaction shifts equilibrium left, so SO3 decreases, not increases.

B. Raising the temperature shifts the exothermic equilibrium to the left: SO2 and O2 increase and SO3 decreases.

C. The concentration of SO3 changes; it does not stay the same.

D. SO3 decreases when the equilibrium shifts left.

Question 130 Chemistry

[Table of standard reduction potentials: Mg2+ + 2e- -> Mg, E = -2.37 V; Zn2+ + 2e- -> Zn, E = -0.76 V; 2H+ + 2e- -> H2, E = 0.000 V; Cu2+ + 2e- -> Cu, E = +0.34 V; Cl2 + 2e- -> 2Cl-, E = +1.36 V; Au3+ + 2e- -> Au, E = +1.50 V.] Keeping in view the values of standard reduction potential given above, which one of the following would you select as a feasible redox chemical reaction?

- A. Mg + 2H+ -> Mg2+ + H2 ✓ **Correct answer**
- B. Cu + Zn2+ -> Cu2+ + Zn
- C. 2Cl- + I2 -> Cl2 + 2I-
- D. 2Au + 6H+ -> 2Au3+ + 3H2

.37 V) is a stronger reducing agent than H2, so it reduces H+ to H2: feasible.

B. Cu (E = +0.34 V) cannot reduce Zn2+ (E = -0.76 V); the reverse reaction is feasible.

C. Cl- cannot reduce I2; chlorine (E = +1.36 V) is a stronger oxidising agent than iodine.

D. Au (E = +1.50 V) cannot reduce H+; gold is below hydrogen in the reactivity series.

Question 131 Chemistry

Modern periodic table is arranged in ascending order of?

- A. Atomic mass
- B. Proton number ✓ **Correct answer**
- C. Mass number
- D. Nucleon number

A. Mendeleev's table used atomic mass; the modern table does not.

B. The modern periodic table is arranged in ascending order of proton (atomic) number.

C. Mass number is not the ordering principle of the modern table.

D. Nucleon number is the mass number; it is not the ordering principle.

Question 132 Chemistry

In the second period of elements, although oxygen lies next to nitrogen yet its ionization first energy is lower than that of nitrogen because?

- A. Oxygen is paramagnetic in character.
- B. In oxygen, there exists repulsion between pair of electrons present in the same orbital of valence shell. ✓ **Correct answer**
- C. Nuclear charge of oxygen is greater than nitrogen.
- D. Oxygen has higher electron affinity.

A. Paramagnetism does not lower the first ionization energy.

, the paired electrons in one 2p orbital repel each other, making one easier to remove than in nitrogen's half-filled 2p3.

C. Greater nuclear charge would raise, not lower, the ionization energy.

D. Electron affinity is a different property and does not explain this.

Question 133 Chemistry

Chlorofluorocarbons (CFCs) are important compounds which are used as refrigerants but these are also responsible for Ozone layer depletion. If a Chlorofluorocarbon CFCl3 is present in stratosphere, which of it's reaction intermediates are actually responsible for the breakdown of Ozone molecule?

- A. CFCl2. and Cl.
- B. Cl. and ClO. ✓ **Correct answer**
- C. CFCl2. and ClO.
- D. CFCl2. and CFCl3

A. CFCl2. alone does not destroy ozone; the chlorine radical is the key species.

B. Cl. radicals and ClO. radicals form the catalytic cycle that destroys ozone.

C. CFCl2. is a photolysis fragment, but the ozone-destroying pair is Cl. and ClO.

D. CFCl3 is the parent compound, not a reactive intermediate.

Question 134 Chemistry

Solution contains 85.5 g of sucrose (C12H22O11) in 250 cm3. What is its molarity?

- A. 0.5 M
- B. 2 M
- C. 0.25 M
- D. 1 M ✓ **Correct answer**

ıld result from 85.5 g in 300 cm3, not 250 cm3.

B. 2 M would require 171 g in 250 cm3.

C. 0.25 M is the number of moles, not the molarity.

D. Moles = 85.5/342 = 0.25 mol in 0.25 L, so molarity = 1 M.

Question 135 Chemistry

Which of the following is the electronic configuration of Cr?

- A. [Ar] 3d6 4s0
- B. [Ar] 3d4 4s2
- C. [Ar] 3d5 4s2
- D. [Ar] 3d5 4s1 ✓ **Correct answer**

A. [Ar] 3d6 4s0 would be 24 electrons in the wrong distribution.

B. [Ar] 3d4 4s2 is the expected order, but chromium adopts the half-filled configuration.

C. [Ar] 3d5 4s2 would be 25 electrons, one too many for Cr.

D. Chromium (Z = 24) is [Ar] 3d5 4s1, with half-filled 3d and 4s subshells.

Question 136 Chemistry

All the collisions between the particles of gases are elastic in nature. What is meant by "Elastic Collisions"?

- A. No change in potential energy during the collisions
- B. The velocity of the molecules changes
- C. No change in the kinetic energy ✓ **Correct answer**
- D. No change in mass during the collisions

A. Potential energy is not the conserved quantity in an elastic collision.

do change in collisions, that is not what 'elastic' means.

C. In an elastic collision there is no change in the total kinetic energy.

D. Mass is conserved in all collisions, elastic or not.

Question 137 Chemistry

Aqueous solutions of Iodine and Sodium hydroxide were mixed in a round bottom flask at 70C. Following chemical reaction was carried out. 3I2 + 6NaOH -> NaIO3 + NaI + H2O [as printed; the balanced form is 3I2 + 6NaOH -> NaIO3 + 5NaI + 3H2O]. This reaction is termed as

- A. Redox reaction ✓ **Correct answer**
- B. Free radical reaction
- C. Precipitation reaction
- D. Substitution reaction

A. Iodine is both oxidised (to IO3-) and reduced (to I-): a redox (disproportionation) reaction.

B. No free radicals are involved in this reaction.

C. No precipitate is formed in this reaction.

D. No substitution takes place here. (Note: the equation is printed unbalanced in the paper ("NaI + H2O" with no coefficients); the balanced form is 3I2 + 6NaOH -> NaIO3 + 5NaI + 3H2O.)

Question 138 Chemistry

Carboxylic acids can be reduced into corresponding alcohols. Which of the following reagent can be used for this purpose?

- A. LiAlH4 ✓ **Correct answer**
- B. K2Cr2O4

- D. H2SO4

A. LiAlH4 is a strong reducing agent that reduces carboxylic acids to primary alcohols.

B. K2Cr2O4 is not a reducing agent for carboxylic acids.

C. KMnO4 is an oxidising agent, not a reducing agent.

D. H2SO4 is not a reducing agent for carboxylic acids.

Question 139 Chemistry

How many moles of calcium carbonate are present in 1.75 kg of calcium carbonate? (Ar of Ca = 40, Ar of C = 12, Ar of O = 16)

- A. 0.0175 mol
- B. 1.75 mol
- C. 17.5 mol ✓ **Correct answer**
- D. 1750 mol

A. 0.0175 mol would be 1.75 g, not 1.75 kg.

B. 1.75 mol would be 175 g, not 1.75 kg.

C. Mr(CaCO3) = 40 + 12 + 48 = 100; moles = 1750 g / 100 = 17.5 mol.

D. 1750 mol would be 175 kg of calcium carbonate.

Question 140 Chemistry

Which of the following molecule shows cis- trans isomers?

- A. C2HCl3
- B. C2H2Cl4
- C. C2H4
- D. C2H2Br2 ✓ **Correct answer**

ichloroethene) has two Cl atoms on one carbon, so it cannot show cis-trans isomerism.

B. C2H2Cl4 (1,1,2,2-tetrachloroethene) has identical substituents on each carbon, so no cis-trans isomerism.

C. C2H4 has only hydrogens, so no cis-trans isomerism.

D. C2H2Br2 (1,2-dibromoethene) has H and Br on each carbon and shows cis-trans isomerism.

Question 141 Physics

Heavy nucleus of atoms go through fission so that they can:

- A. absorb high amount of energy
- B. absorb low amount of energy
- C. increase their binding energy per nucleon ✓ **Correct answer**
- D. reduce their binding energy per nucleon

A. Fission releases energy; the nuclei do not absorb energy.

B. Fission releases energy; the nuclei do not absorb it.

C. Fission splits a heavy nucleus into lighter nuclei with a higher binding energy per nucleon, releasing the difference as energy.

D. Fission increases, not reduces, the binding energy per nucleon.

Question 142 Physics

For projectile motion in the absence of air resistance:

- A. vertical speed is constant
- B. horizontal force is constant
- C. horizontal acceleration is zero ✓ **Correct answer**

tical acceleration is zero

A. Vertical speed changes continuously because of gravity.

B. No horizontal force acts on the projectile (in the absence of air resistance).

C. With no horizontal force, the horizontal acceleration is zero.

D. Vertical acceleration is g (9.81 m/s2), not zero.

Question 143 Physics

The range of the projectile depends upon the velocity of the projection and the angle of the projection i.e 45°. For a fixed velocity, when the angle of projection is larger than 45°. Which of the following is correct?

- A. Both the height and the range attained by the projectile will be less.
- B. Both the height and the range attained by the projectile will be more.
- C. The height attained by the projectile will be less but the range is more.
- D. The height attained by the projectile will be more but the range is less. ✓ **Correct answer**

A. The height increases above 45 degrees; it is not less.

B. The range decreases above 45 degrees; it is not more.

C. The height is more, not less, above 45 degrees.

D. Above 45 degrees the projectile goes higher (more height) but lands closer (less range).

Question 144 Physics

The wavelength of the electromagnetic wave having frequency of 3 kHz will be?

- A. 80 km
- B. 140 km
- C. 100 km ✓ **Correct answer**

km

A. 80 km would correspond to a frequency of 3.75 kHz.

B. 140 km would correspond to a frequency of about 2.14 kHz.

C. Wavelength = c/f = 3 x 108 / 3 x 103 = 1 x 105 m = 100 km.

D. 120 km would correspond to a frequency of 2.5 kHz.

Question 145 Physics

An alternation voltage V (in volts) is represented by the equation: V = 300 sin (100πt). What is the value of 'f' for this voltage?

- A. 25 Hz
- B. 200 Hz
- C. 50 Hz ✓ **Correct answer**
- D. 100 Hz

A. 25 Hz would come from a coefficient of 50pi in the sine term.

B. 200 Hz would come from a coefficient of 400pi in the sine term.

C. Comparing with V = V0 sin(2pif t): 2pif = 100pi, so f = 50 Hz.

D. 100 Hz would come from a coefficient of 200pi in the sine term.

Question 146 Physics

The diameter of a wire is measured by using a micrometer screw gauge with least count of 0.01 mm, then which of the following readings will be correct?

- A. 0.067 cm ✓ **Correct answer**
- B. 0.0067 mm
- C. 0.67 cm
- D. 6.70 cm

= 0.67 mm, which is consistent with a 0.01 mm least count (two decimal places in mm).

B. 0.0067 mm is below the least count of 0.01 mm and cannot be read.

C. 0.67 cm = 6.7 mm is a valid reading format, but the correct reading among the options is 0.067 cm.

D. 6.70 cm = 67.0 mm is far too large for a wire measured with a micrometer screw gauge.

Question 147 Physics

Which of the following is statement shows that no work is done?

- A. Pushing a car to start it moving
- B. Writing an essay on a page.
- C. Lifting the weights.
- D. The moon orbiting the earth. ✓ **Correct answer**

A. Pushing a car to move it does work (force over a distance).

B. Writing an essay involves work (the hand moves the pen).

C. Lifting weights does work against gravity.

D. The moon's motion is perpendicular to the gravitational force, so no work is done.

Question 148 Physics

When the length of simple pendulum is doubled, then ratio of its new time period to old time period is:

- A. $2\sqrt{2}$
- B. $-\sqrt{2}$
- C. $\sqrt{2}$ ✓ **Correct answer**
- D. $1/\sqrt{2}$

ould be the ratio if the period were proportional to length squared.

B. A negative ratio is impossible for time periods.

C. T is proportional to the square root of length, so doubling length gives Tnew/Told = root 2.

D. 1/root 2 would be the ratio if the length were halved.

Question 149 Physics

The direction of current through the load resistance of a full-wave rectification circuit:

- A. inverts for negative cycle
- B. changes for every cycle
- C. inverts for positive cycle
- D. remains constant ✓ **Correct answer**

A. In a full-wave rectifier the current through the load flows the same way in both half-cycles.

B. The current through the load does not change direction each cycle.

C. The current through the load does not invert in the positive half-cycle.

D. Full-wave rectification makes the load current flow in one direction only, in both half-cycles.

Question 150 Physics

A wire has a spring constant of 5 x 104 N m-1. It is stretched by a force to extension of 1.4 mm. Calculate the strain energy stored in the wire.

- A. 4.9 x 10-5 J
- B. 4.9 J
- C. 4.9 x 10-5 J

x 10-2 J ✓ **Correct answer**

A. 4.9 x 10-5 J is the result of using 1.4 x 10-6 m instead of 1.4 x 10-3 m.

B. 4.9 J would result from using 1.4 cm instead of 1.4 mm.

C. 4.9 x 10-5 J is the result of using the wrong extension (this is a duplicate of option A in the paper).

D. Strain energy = 1/2 k x2 = 0.5 x 5 x 104 x (1.4 x 10-3)2 = 4.9 x 10-2 J. (Note: options A and C print the IDENTICAL value (4.9 x 10-5 J) in the paper — a misprint, not a defect: both are wrong and the correct value D (4.9 x 10-2 J) is unique.)

Question 151 Physics

If two objects of equal masses 'm' are moving towards each other with the same speeds 'v' then what will be the total final momentum after elastic head-on collision?

- A. -mv kg/s
- B. mv kg m/s
- C. 2 mv kg/s
- D. 0 kg m/s ✓ **Correct answer**

A. -mv would be the momentum if one mass were moving alone.

B. mv is the momentum of one mass alone, not the total.

C. 2mv would be the total if both masses moved in the same direction.

D. The two equal and opposite momenta cancel, so the total momentum is zero.

Question 152 Physics

Molecules of a gas at constant pressure for a fixed amount of gas have average kinetic energy X. Increasing temperature from 27°C to 327°C, average K.E. of molecules will become:

- B. 20X
- C. 300X
- D. 2X ✓ **Correct answer**

A. 200X would result from using 27,000 K / 300 K, which is wrong.

B. 20X has no basis in the temperature ratio.

C. 300X would result from using the Celsius values 327/27, which is wrong.

D. Average K.E. is proportional to absolute temperature: 600 K / 300 K = 2, so the energy becomes 2X.

Question 153 Physics

An automobile is moving forwards with uniform velocity due to the force exerted by its engine. If that force is double with the velocity remaining constant what happens to its total power?

- A. It does not change
- B. It is squared
- C. It is halved
- D. It is doubled ✓ **Correct answer**

A. Power = force x velocity, so doubling the force doubles the power.

B. Power depends linearly on force, not on its square.

C. Doubling the force increases, not halves, the power.

D. Power = F x v; with v constant and F doubled, the power is doubled.

Question 154 Physics

In Double Slit experiment, the fringe spacing of the diffracted rays increases when:

distance between the screen and the slits decreases

- B. the wavelength of the diffracted rays increases ✓ **Correct answer**
- C. the distance from mid points of the slits to the central point of the fringe on the screen increases
- D. the distance between the slits increases

A. Fringe spacing is directly proportional to the screen distance, so decreasing it decreases the spacing.

B. Fringe spacing y = (wavelength x D) / d, so increasing the wavelength increases the spacing.

C. This describes the fringe position, not the spacing.

D. Increasing the slit separation d decreases the fringe spacing.

Question 155 Physics

The area under the extension-load graph of an elastic material whose elastic limit has not been exceeded gives its:

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

A. Stress is force per unit area, not the area under the graph.

B. The area under a load-extension graph is the work done (strain energy) stored in the material.

C. Young modulus is the gradient of a stress-strain graph.

D. Strain is the fractional extension, not the area under the graph.

156 Physics

Minimum energy required to eject an electron from metal surface is called:

- A. Work function ✓ **Correct answer**
- B. Stopping potential
- C. Threshold frequency
- D. Electromotive force

A. The work function is the minimum energy needed to eject an electron from a metal surface.

B. Stopping potential is the voltage that just stops the most energetic photoelectrons.

C. Threshold frequency is the minimum frequency of light that can eject electrons.

D. Electromotive force is the voltage of a source, not an ejection energy.

Question 157 Physics

The unit of magnetic flux density is the tesla, 'T', it can also be expressed as

- A. 1 N-1 A-1 m
- B. 1 N-1 A-1 m-1
- C. 1 N A-1 m
- D. 1 N A-1 m-1 ✓ **Correct answer**

A. 1 N-1 A-1 m is the reciprocal of the tesla.

B. 1 N-1 A-1 m-1 is also the reciprocal form and is wrong.

C. 1 N A-1 m would be the unit of magnetic flux, not flux density.

D. B = F/(I L), so 1 T = 1 N A-1 m-1.

158 Physics

Percentage un-certainty in length and width of a rectangle is 2% and 3%. The total un-certainty in area of that rectangle is?

- A. 1.5%
- B. 5% ✓ **Correct answer**
- C. 6%
- D. 1%

A. 1.5% would be half the difference of the uncertainties.

B. For a product, percentage uncertainties add: 2% + 3% = 5%.

C. 6% would be the product of the uncertainties, which is not how they combine.

D. 1% would be the difference of the uncertainties, which is wrong.

Question 159 Physics

What is the quark composition of a Proton?

- A. Two up quarks and one down quark ✓ **Correct answer**
- B. One up quark and two strange quarks
- C. Two up quarks and one strange quark
- D. Two down quarks and one up quark

A. A proton is uud: two up quarks and one down quark.

B. Strange quarks are not part of a proton.

C. A proton contains no strange quark.

D. Two down quarks and one up quark is a neutron.

160 Physics

What will be the expression for the observed frequency, if the source is moving towards the observer?

- A. f0 = (v/(v-us))f ✓ **Correct answer**
- B. f0 = (v/(v±us))f
- C. f0 = (v/(v+us))f
- D. f = (v/(v-us))f0

A. For a source moving towards the observer, f0 = (v/(v - us)) f, so the observed frequency increases.

B. The general form with ± is not the specific expression for a source approaching.

C. f0 = (v/(v + us)) f is for a source moving away from the observer.

D. This inverts the observed and source frequencies.

Question 161 Physics

Work done due to centripetal force for circular motion will be:

- A. Reduced
- B. Maximum
- C. Half
- D. Zero ✓ **Correct answer**

A. Work is not reduced; it is zero because the force is perpendicular to the motion.

B. Work is not maximum; the centripetal force does no work.

C. Work is not half; it is zero.

D. The centripetal force acts perpendicular to the displacement, so the work done is zero.

162 Physics

If we give a direct current to the transformer's primary coil, then there will be:

- A. Less emf produced in the secondary
- B. No emf produced in the secondary ✓ **Correct answer**
- C. Equal emf produced in the secondary
- D. More emf produced in the secondary

A. A steady direct current produces no changing flux, so no emf at all is induced.

B. A transformer needs a changing magnetic flux; with d.c. the flux is constant, so no emf is induced in the secondary.

C. No emf is produced; equal emf would require an alternating current.

D. No emf is produced; a larger emf is impossible with d.c.

Question 163 Physics

The value and units of the Planck constant 'h' can be expressed as:

- A. 6.63 x 10-34 Js-1
- B. 6.63 x 10-43 Js
- C. 6.63 x 10-34 Js ✓ **Correct answer**
- D. 3.63 x 10-34 Js

A. Js-1 (joules per second) is the unit of power, not of Planck's constant.

B. 10-43 is the wrong order of magnitude for Planck's constant.

C. h = 6.63 x 10-34 Js (energy x time).

D. 3.63 x 10-34 Js has the wrong numerical value.

164 Physics

A negligible small current between input terminals of the operational amplifier is because of:

- A. Low input resistance
- B. Low output resistance
- C. High output resistance
- D. High input resistance ✓ **Correct answer**

A. Low input resistance would draw a large input current.

B. Output resistance does not determine the input current.

C. High output resistance does not determine the input current.

D. An op-amp has a very high input resistance, so almost no current flows into its input terminals.

Question 165 Physics

If a conductor of length 7m is placed in a magnetic field of strength 0.3T carrying current 1A, parallel to the field. What will be the force acting on it due to this magnetic field?

- A. 2.1 N
- B. 0 N ✓ **Correct answer**
- C. 3.1 N
- D. 7 N

A. 2.1 N would be BIL with sin 90°, but the conductor is parallel to the field.

B. F = BIL sin(theta); parallel to the field means theta = 0, so F = 0.

C. 3.1 N has no basis in the given values.

D. 7 N would be the force for a 1 T field with the conductor perpendicular.

166 Physics

The horizontal component of Earth magnetic flux density is 1.8x10-6 T. The current in a horizontal cable is 160A. Calculate the maximum force per unit length?

- A. 2.88x10-4 N/m ✓ **Correct answer**
- B. 2.88x10-8 N/m
- C. 2.88x10-2 N/m
- D. 2.88x10-6 N/m

A. Maximum force per unit length = B I = 1.8 x 10-6 x 160 = 2.88 x 10-4 N/m.

B. 2.88 x 10-8 N/m is 10,000 times too small.

C. 2.88 x 10-2 N/m is 100 times too large.

D. 2.88 x 10-6 N/m ignores the current of 160 A.

Question 167 Physics

If we change the magnetic flux linking a coil by rotating the coil in a constant magnetic field, the rate of change of this flux is:

- A. Proportional to the emf produced in it ✓ **Correct answer**
- B. Proportional to the change in magnetic field
- C. Proportional to the resistance of the coil
- D. Proportional to the material of the coil

A. By Faraday's law, the induced emf is proportional to the rate of change of magnetic flux.

B. The rate of change of flux is proportional to the emf, not to the change in the field alone.

C. Resistance determines the current, not the induced emf.

D. The material of the coil does not determine the rate of change of flux.

168 Physics

Electric field strength of a point charge is E and electric potential is V at a distance r from the point charge. What is the electric potential at a point for the same point charge where electric field strength is E/4?

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

A. V/4 would follow if V were proportional to E2, which it is not.

B. E is proportional to 1/r2 and V to 1/r, so E/4 means r doubles and V halves: V/2.

C. 4V would be the potential at a quarter of the distance.

D. 2V would be the potential at half the distance.

Question 169 Physics

In simple harmonic motion, acceleration will be maximum, when object is at:

- A. maximum displacement from the mean position ✓ **Correct answer**
- B. center position
- C. mean position
- D. half of the maximum displacement from mean position

A. Acceleration a = -omega2 x, so it is maximum at maximum displacement from the mean position.

B. At the centre position the displacement is zero, so the acceleration is zero.

C. At the mean position the acceleration is zero.

D. At half the maximum displacement the acceleration is half its maximum value.

170 Physics

Calculate the energy of a photon of frequency 3.0 x 1018 Hz. (h = 6.63 x 10-34)

- A. 19.89 x 10-18 J
- B. 1.89 x 10-16 J
- C. 11.89 x 10-16 J
- D. 19.89 x 10-16 J ✓ **Correct answer**

A. 19.89 x 10-18 J is 100 times too small.

B. 1.89 x 10-16 J has the wrong numerical value.

C. 11.89 x 10-16 J has the wrong numerical value.

D. E = hf = 6.63 x 10-34 x 3.0 x 1018 = 19.89 x 10-16 J.

Question 171 Physics

In relation λ T1/2 = 0.693, which quantity is represented by λ?

- A. half life
- B. wavelength
- C. activity
- D. decay constant ✓ **Correct answer**

A. Half life is T1/2, not lambda.

B. Wavelength is also written as lambda in optics, but in this decay relation lambda is not the wavelength.

C. Activity is lambda times N, not lambda itself.

D. In lambda T1/2 = 0.693, lambda is the decay constant.

172 Physics

Path difference for the destructive interference can be written as:

- A. Δs = n λ
- B. Δs = (n + 1/3) λ/2
- C. Δs = 2n(λ)
- D. Δs = (2n + 1) λ/2 ✓ **Correct answer**

A. Path difference n x wavelength gives constructive interference.

B. (n + 1/3) x wavelength/2 is not a standard interference condition.

C. 2n x wavelength is a multiple of the wavelength, giving constructive interference.

D. Destructive interference occurs when the path difference is an odd multiple of half a wavelength: (2n + 1) x wavelength/2.

Question 173 Physics

If a light is emitted by a single source passes through two narrow slits 1.00 mm apart. The interference pattern is observed on a screen 200 cm away and the separation between the centres of adjacent bright fringes is 2.00 mm. What would be the wavelength of the light?

- A. 2 μm
- B. 1 μm ✓ **Correct answer**
- C. 2 pm
- D. 1 nm

A. 2 micrometres would result from using a fringe spacing of 4 mm.

B. Wavelength = (fringe spacing x slit separation) / screen distance = (2 x 10-3 x 1 x 10-3) / 2 = 1 x 10-6 m = 1 micrometre.

C. 2 picometres is far too small for visible light.

tre is far too small for visible light.

Question 174 Physics

The sum of all forms of molecular energies (Kinetic and Potential) of a substance is termed as?

- A. Internal energy ✓ **Correct answer**
- B. Elastic energy
- C. Heat energy
- D. Absolute energy

A. Internal energy is the sum of the kinetic and potential energies of the molecules of a substance.

B. Elastic energy is stored energy in a deformed body, not the total molecular energy.

C. Heat energy is energy transferred due to a temperature difference, not the total stored molecular energy.

D. Absolute energy is not the term for the sum of molecular energies.

Question 175 Physics

Calculate the rate at which energy is transferred by 220 V mains supply which provides a current of 0.1 A to a LED?

- A. 22 kW
- B. 2.2 kW
- C. 22 W ✓ **Correct answer**
- D. 2.2 W

A. 22 kW would result from a current of 100 A.

B. 2.2 kW would result from a current of 10 A.

x 1 = 220 x 0.1 = 22 W.

D. 2.2 W would result from a voltage of 22 V.

Question 176 Physics

A particle carrying a charge of 5e falls through a potential difference of 25V. What would be energy acquired by the particle in 'J'.

- A. 125 x 10-19 J
- B. 1.6 x 10-19 J
- C. 125 x 1.6 x 10-19 J ✓ **Correct answer**
- D. 125 J

A. 125 x 10-19 J omits the elementary charge (1.6 x 10-19 C).

B. 1.6 x 10-19 J is the energy of one elementary charge through 1 V.

C. Energy = qV = 5e x 25 V = 125 x 1.6 x 10-19 J.

D. 125 J would result from a charge of 5 C, not 5e.

Question 177 Physics

A copper wire has length L and cross-sectional A. Its resistance is R. If we halved the length and halved the diameter of wire then what will be the resistance of this wire?

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

A. R would be the resistance if the length and area changed in the same ratio.

B. 3R has no basis in the given changes.

C. Halving the length halves R, halving the diameter quarters the area, which quadruples

4 = 2R.

D. 4R would result from halving the diameter alone, ignoring the halved length.

Question 178 Physics

Kirchhoff's first law/rule corresponds to:

- A. Law of conservation of energy
- B. Law of conservation of charge ✓ **Correct answer**
- C. Law of conservation of momentum
- D. Law of conservation of mass

A. Conservation of energy is Kirchhoff's second law (the voltage law).

B. Kirchhoff's first (current) law states that charge entering a junction equals charge leaving it: conservation of charge.

C. Momentum is not the conserved quantity in Kirchhoff's first law.

D. Mass is not the conserved quantity in Kirchhoff's first law.

Question 179 Physics

Electric field strength at a point between oppositely charged plates is E. If the distance between plates is reduced to half, what will be the new value of electric intensity?

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

A. 4E would follow if E were proportional to 1/d2, which it is not for parallel plates.

B. E/2 would follow if E decreased with decreasing distance, which it does not.

C. E/4 has no basis here.

el plates E = V/d, so halving d doubles E.

Question 180 Physics

An object is moving along a circular path of radius 4m. What will be its angular displacement if it moves 14m on this circular path?

- A. 5.5 radians
- B. 3.5 radians ✓ **Correct answer**
- C. 5.0 radians
- D. 4.5 radians

A. 5.5 radians would be the displacement for a radius of 2.5 m.

B. Angular displacement = arc length / radius = 14/4 = 3.5 radians.

C. 5.0 radians would be the displacement for an arc of 20 m.

D. 4.5 radians would be the displacement for an arc of 18 m.

Question 181 English

The accident happened due to the driver's ------.

- A. Nuisance
- B. Negligence ✓ **Correct answer**
- C. Reluctance
- D. Regret

A. Nuisance means an annoyance; it does not cause an accident.

B. Negligence (carelessness) is the cause of an accident.

C. Reluctance means unwillingness; it does not cause an accident.

D. Regret is sorrow after the event, not its cause.

182 English

They sometimes feel a ------ for the mountains and the sea.

- A. Yearning ✓ **Correct answer**
- B. Yelling
- C. Yielding
- D. Yapping

A. Yearning (a strong longing) fits the feeling for the mountains and the sea.

B. Yelling means shouting; it does not fit a feeling.

C. Yielding means giving way; it does not fit.

D. Yapping means barking or chattering; it does not fit.

Question 183 English

I ------ caution in interpreting these results.

- A. Uproot
- B. Usher
- C. Usurp
- D. Urge ✓ **Correct answer**

A. Uproot means to pull up by the roots; it does not fit interpreting results.

B. Usher means to show in; it does not fit.

C. Usurp means to seize power; it does not fit.

D. Urge caution (advise caution) fits interpreting results carefully.

Question 184 English

She was feeling ---------- even after five hours of the surgery.

- ggy ✓ **Correct answer**
- B. Grope
- C. Haggard
- D. Pally

A. Groggy (dazed and weak, as after anaesthesia) fits feeling unwell after surgery.

B. Grope means to feel about with the hands; it does not fit.

C. Haggard means looking exhausted and ill, but 'feeling haggard' is less idiomatic after surgery.

D. Pally means friendly; it does not fit. (Key: Learnospot/PLS key lists C — Haggard, but its option set lacks Groggy entirely (A Mumbled, B Haggard, C Pally, D Grope); the paper's option set includes Groggy, and "feeling groggy" is the standard post-surgery collocation. Corrected to A.)

Question 185 English

The new teacher showed no -------- about hitting the students.

- A. Quotation
- B. Qualms ✓ **Correct answer**
- C. Quakes
- D. Quarrel

A. Quotation means a quoted passage; it does not fit.

B. Qualms (misgivings) fits: the teacher had no misgivings about hitting the students.

C. Quakes means tremors; it does not fit.

D. Quarrel means a dispute; it does not fit.

186 English

The parents were stunned when they saw that children had created complete----------in the bedroom:

- A. Knack
- B. Mayhem ✓ **Correct answer**
- C. Groggy
- D. Dank

A. Knack means a skill; it does not fit.

B. Mayhem (chaos, disorder) fits what the children created in the bedroom.

C. Groggy means dazed; it does not fit.

D. Dank means damp; it does not fit.

Question 187 English

The culpable child -------- some words to her mother for pardoning his delinquency.

- A. Rude
- B. Mumbled ✓ **Correct answer**
- C. Crazy
- D. Showy

A. Rude is an adjective; the sentence needs a verb.

B. Mumbled (said quietly and unclearly) fits a child pleading for pardon.

C. Crazy is an adjective; the sentence needs a verb.

D. Showy is an adjective; the sentence needs a verb.

188 English

Choose the CORRECT sentence:

- A. He asked, "Is your brother home?" ✓ **Correct answer**
- B. He asked "Is your brother home?"
- C. He asked, "Is your brother home"?
- D. He asked "Is your brother home?".

A. This sentence is punctuated correctly: the comma after 'asked' and the question mark inside the closing quotation marks.

B. The comma after 'asked' is missing before the quotation.

C. The question mark must come inside the closing quotation marks.

D. The comma after 'asked' is missing and the full stop after the closing quote is wrong.

Question 189 English

Choose the CORRECT sentence:

- A. I was been to America for medical check up.
- B. I had being to America for medical check up.
- C. I have been to America for medical check up. ✓ **Correct answer**
- D. I has been to America for medical check up.

A. 'I was been' is incorrect grammar.

B. 'I had being' is incorrect grammar.

C. 'I have been to America for medical check up' is grammatically correct.

D. 'I has been' is incorrect: 'has' does not agree with 'I'.

190 English

Choose the CORRECT sentence:

- A. After breaking the glass, Ruby said "Please don't tell on me."
- B. After breaking the glass Ruby said: "Please don't tell on me."
- C. After breaking the glass, Ruby said: "Please don't tell on me." ✓ **Correct answer**
- D. After breaking the glass Ruby said: please don't tell on me.

A. The comma is needed after the introductory clause, and a colon is needed before the quotation.

B. The comma after the introductory clause is missing.

C. 'After breaking the glass, Ruby said: "Please don't tell on me."' is correctly punctuated.

D. The quoted sentence must begin with a capital letter and the introductory clause needs a comma.

Question 191 English

Choose the CORRECT sentence:

- A. It is healthful to eat a variety of food. ✓ **Correct answer**
- B. It were healthful to eat a variety of food.
- C. It is healthful to ate a variety of food.
- D. It were healthful to ate a variety of food.

A. 'It is healthful to eat a variety of food' is grammatically correct.

B. 'It were' does not agree with the singular subject 'it'.

C. 'to ate' is incorrect: the infinitive is 'to eat'.

D. Both 'were' and 'ate' are incorrect here.

192 English

Choose the CORRECT sentence:

- A. We hadn't the foggy notion of the worker who tried to spoil the company's reputation.
- B. We hadn't the foggiest notion of the worker who tries to spoil the company's reputation.
- C. We hadn't the foggiest notion of the worker whom tried to spoil the company's reputation.
- D. We hadn't the foggiest notion of the worker who tried to spoil the company's reputation. ✓ **Correct answer**

A. 'the foggy notion' is the wrong idiom; the phrase is 'the foggiest notion'.

B. 'who tries' is the wrong tense; the sentence is in the past ('hadn't').

C. 'whom tried' is wrong: 'who' is the subject of 'tried'.

D. 'We hadn't the foggiest notion of the worker who tried to spoil the company's reputation' is correct.

Question 193 English

Choose the CORRECT sentence:

- A. We use to play football when we lived abroad.
- B. We are used to play football when we lived abroad.
- C. We used to play football when we lived abroad. ✓ **Correct answer**
- D. We have use to play football when we lived abroad.

A. 'We use to play' is incorrect for a past habit.

B. 'are used to play' is incorrect: 'be used to' takes a gerund ('playing').

C. 'We used to play football when we lived abroad' is correct for a past habit.

to play' is incorrect grammar.

Question 194 English

SPOT THE ERROR: She had one of those picture children often reproduced in advertising leaflets and the photogravure sections of the Sunday papers. [The underlined segments are: A "She had", B "picture children", C "the photogravure", D "Sunday papers".]

- A. She had
- B. picture children ✓ **Correct answer**
- C. the photogravure
- D. Sunday papers

A. 'She had' is correct.

B. 'picture children' is the error: it should be 'pictures of children'.

C. 'the photogravure' is correct.

D. 'Sunday papers' is correct.

Question 195 English

SPOT THE ERROR: When the mother threatened to lock Aslam in the attic, the mere thought for being confined made him breathless. [The underlined segments are: A "the mother", B "threatened to", C "in the attic", D "thought for".]

- A. the mother
- B. threatened to
- C. in the attic
- D. thought for ✓ **Correct answer**

A. 'the mother' is correct.

B. 'threatened to' is correct.

c' is correct.

D. 'thought for' is the error: it should be 'thought of being confined'.

Question 196 English

SPOT THE ERROR: Let's hurry. The bus is leaving to the last stop. [The underlined segments are: A "Let's hurry", B "The bus", C "is", D "to".]

- A. Let's hurry
- B. The bus
- C. is
- D. to ✓ **Correct answer**

A. 'Let's hurry' is correct.

B. 'The bus' is correct.

C. 'is' is correct.

D. 'to' is the error: it should be 'leaving for the last stop'.

Question 197 English

SPOT THE ERROR: Despite all my enthusiastic chain of effort, I could not attained the desired results to be crowned with brilliant success. [The underlined segments are: A "Despite", B "chain of effort", C "attained", D "crowned with".]

- A. Despite
- B. chain of effort
- C. attained ✓ **Correct answer**
- D. crowned with

A. 'Despite' is correct.

B. 'chain of effort' is correct.

is the error: after 'could not' the base form 'attain' is required.

D. 'crowned with' is correct.

Question 198 English

SPOT THE ERROR: Education and economic progress along with good governance is the factor that take a country towards quick development. [The underlined segments are: A "along with", B "is the factor", C "take", D "towards".]

- A. along with
- B. is the factor
- C. take ✓ **Correct answer**
- D. towards

A. 'along with' is correct.

B. 'is the factor' is correct (the subject is singular).

C. 'take' is the error: the relative clause refers to 'the factor', so it should be 'takes'.

D. 'towards' is correct.

Question 199 English

SPOT THE ERROR: Ali and Irfan have to receive the guests at the reception of the hotel, while Amir have to bring their bags from the cars. [The underlined segments are: A "have" (Ali and Irfan have), B "at the reception", C "have" (Amir have), D "from".]

- A. have
- B. at the reception
- C. have ✓ **Correct answer**
- D. from

A. 'have' (Ali and Irfan have) is correct for a plural subject.

eption is correct.

C. 'have' (Amir have) is the error: the singular subject 'Amir' needs 'has'.

D. 'from' is correct.

Question 200 English

SPOT THE ERROR: Ruth was wondering what she could do for help but she did not know what to do. [The underlined segments are: A "Ruth was", B "do for help", C "did not", D "what to do".]

- A. Ruth was
- B. do for help ✓ **Correct answer**
- C. did not
- D. what to do

A. 'Ruth was' is correct.

B. 'do for help' is the error: it should be 'do to help'.

C. 'did not' is correct.

D. 'what to do' is correct.

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