MDCAT (DUHS Entrance Test 2008, Sindh) — 2008 · Solved Past Paper

Body: Dow University of Health Sciences (DUHS) · **Post:** MDCAT (DUHS Entrance Test 2008, Sindh) · **Year:** 2008 · **Questions:** 100 in the original paper — **99 solved and verified**, 1 excluded as defective (Q74) · **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 2008 sitting.

Source note: Question stems and options: DUHS Entrance Test 2008, Sindh (educationinkarachi.net/wp-content/uploads/2026/09/DUHS-Sindh-Entrance-Test-2008-Original-Answer-Key.pdf, 16 pp.; Q1-100 with complete official answer-key table at the end, Q1-100, no dual-letter entries). Exam held Sunday 29 June 2008 (news report of the test dated Monday 30 June 2008, pakstudy.com forum: more than 5,000 candidates appeared for 650 MBBS/BDS seats; 29 June 2008 was a Sunday; no second source pinning the exact day was found). Printed key letter counts A30 / B26 / C30 / D14. Sections: Biology Q1-30, Chemistry Q31-60, Physics Q61-90, English Q91-100. Q74 is missing from the paper text (the paper jumps from Q73 to Q75; its key entry A exists) and is filed as the single DEFECTIVE-excluded record. 3 PICK-ONE (Q36, Q71, Q94). 10 printed-key errors corrected on textbook/dictionary evidence (Q8 B to A, Q11 A to C, Q14 C to A, Q17 A to C, Q41 B to A, Q66 A to B, Q69 B to C, Q93 D to C, Q95 B to C, Q100 C to A), each recorded in its explanation; an independent solution key for this same paper (AskFilo, Dow Grads 150) corroborates Q8, Q11 and Q14. A few options are marked [?] in the source (faint in the scan: Q39 option D, all four options of Q41) and the stems of Q39, Q41 and Q62 carry faintness notes; the option text is present and is served as printed. Answers verified independently against reference facts, worked derivations and targeted sources, never

nted key alone. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

Question 1 In which of the following is

In which of the following is an exoskeleton of glass-like silica found?

- A. Molluscs
- B. Arthropoda
- C. Diatoms ✓ **Correct answer**
- D. Star fish

A. wrong: molluscs have shells of calcium carbonate, not silica.

B. wrong: arthropods have an exoskeleton of chitin.

C. correct: diatoms are enclosed in a glass-like cell wall (frustule) made of silica.

D. wrong: starfish (echinoderms) have an endoskeleton of calcareous ossicles, not a silica exoskeleton.

Question 2 The food reserve and CO are

The food reserve and CO_2 are stored in:

- A. Plastids ✓ **Correct answer**
- B. Mitochondria
- C. Ribosomes
- D. Nucleus

A. correct: plastids (chloroplasts and leucoplasts) are where carbon dioxide is fixed in photosynthesis and starch, the food reserve, is stored.

B. wrong: mitochondria release energy by respiration; they do not store food or fix carbon dioxide.

osomes synthesise protein.

D. wrong: the nucleus holds the genetic material; it does not store food.

Question 3 Which of the following is replaced

Which of the following is replaced by thymine?

- A. Uracil ✓ **Correct answer**
- B. Cytosine
- C. Guanine
- D. Adenosine

A. correct: in DNA, thymine takes the place of uracil, which occurs only in RNA.

B. wrong: cytosine is present in both DNA and RNA, paired with guanine.

C. wrong: guanine is present in both DNA and RNA, paired with cytosine.

D. wrong: adenosine is a nucleoside, not a base replaced by thymine.

Question 4 Which of the following is NOT

Which of the following is NOT an enzyme?

- A. Polymerase
- B. Hydrolase
- C. Isomerase
- D. Enzymate ✓ **Correct answer**

A. wrong: polymerase is an enzyme (it builds polymers such as DNA and RNA).

B. wrong: hydrolase is an enzyme class (it catalyses hydrolysis).

C. wrong: isomerase is an enzyme class (it catalyses isomerisation).

D. correct: "enzymate" is not an enzyme at all; it is not a recognised enzyme name.

5 Which is the most efficient way

Which is the most efficient way of respiration in the frog?

- A. Pulmonary ✓ **Correct answer**
- B. Bucco-pharyngeal
- C. Both bucco and pharyngeal
- D. Cutaneous

A. correct: in the adult frog the lungs (pulmonary respiration) are the most efficient means of gaseous exchange.

B. wrong: bucco-pharyngeal respiration through the mouth cavity is supplementary, not the most efficient.

C. wrong: this is the same as B, a supplementary route.

D. wrong: cutaneous respiration through the moist skin is supplementary, not the most efficient in the adult frog.

Question 6 Plants convert solar energy into chemical

Plants convert solar energy into chemical energy present in the bonds of a chemical substance, namely:

- A. $NADPH_2$
- B. Nucleotide
- C. ATP ✓ **Correct answer**
- D. RNA

A. wrong: $NADPH_2$ is an intermediate hydrogen carrier in photosynthesis, not the chemical in whose bonds the converted solar energy is stored.

B. wrong: a nucleotide is a building block of nucleic acids, not the energy store.

C. correct: plants convert solar energy into chemical energy stored in the bonds of ATP.

NA carries genetic information, it is not the energy store of photosynthesis.

Question 7 The hormone which helps in the

The hormone which helps in the contraction of the uterus at the time of birth is:

- A. Prolactin
- B. Oxytocin ✓ **Correct answer**
- C. Gonadotrophin
- D. Antidiuretic hormone

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

B. correct: oxytocin causes the uterus to contract at the time of birth.

C. wrong: gonadotrophins act on the gonads, not on the uterus.

D. wrong: antidiuretic hormone (vasopressin) acts on the kidney to reabsorb water.

Question 8 Subcutaneous fat accumulation is essential for

Subcutaneous fat accumulation is essential for the:

- A. Seal ✓ **Correct answer**
- B. Shark
- C. Elephant
- D. Kangaroo

A. correct: seals carry a thick layer of blubber, subcutaneous fat that is essential for insulation in cold water and for energy storage.

B. The printed key: wrong. Sharks do not accumulate subcutaneous fat; they rely on a large oil-filled liver for buoyancy and energy, and as cold-blooded animals they do not need blubber insulation.

C. wrong: elephants have some subcutaneous fat, but it is not essential for their survival

for a seal.

D. wrong: kangaroos have fat reserves but are not dependent on subcutaneous fat accumulation. (PRINTED-KEY ERROR CORRECTED: the printed key records B, "Shark". That is wrong: subcutaneous fat (blubber) is essential for the seal, while the shark stores oil in its liver and has no blubber layer; the independent solution key for this same paper (AskFilo, "Dow Grads 150") and the expert solution (GauthMath) both record A, "Seal". Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 9 Hirudin an anti-clotting factor is found

Hirudin, an anti-clotting factor, is found in the:

- A. Leech ✓ **Correct answer**
- B. Earthworm
- C. Vaucheria
- D. Nereis

A. correct: hirudin, the anti-clotting substance, is found in the saliva of the leech.

B. wrong: the earthworm does not produce hirudin.

C. wrong: Vaucheria is a green alga, not a source of hirudin.

D. wrong: Nereis is a marine polychaete worm; it does not produce hirudin.

Question 10 Animal and plant characters are both

Animal and plant characters are both found in:

- A. Euglena ✓ **Correct answer**
- B. Paramecium
- C. Bacteria
- D. Virus

A. correct: Euglena shows both plant characters (chloroplasts, photosynthesis) and animal

flagellar movement, no cell wall).

B. wrong: Paramecium is purely animal-like, with no plant characters.

C. wrong: bacteria are prokaryotes with neither plant nor animal organisation of this kind.

D. wrong: a virus is non-cellular and shows neither plant nor animal characters.

Question 11 Photogenic bacteria transfer DNA material to

Photogenic bacteria transfer DNA material to another bacterium by:

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

A. The printed key: wrong. Transduction is the transfer of bacterial DNA by a bacteriophage, and the stem mentions no phage or virus.

B. wrong: transformation is the uptake of free DNA from the surroundings, not transfer to another bacterium.

C. correct: conjugation is the transfer of DNA material from one bacterium directly to another through contact (sex pilus).

D. wrong: fragmentation is a method of asexual reproduction, not a means of DNA transfer between bacteria. (PRINTED-KEY ERROR CORRECTED: the printed key records A, "Transduction". That is wrong: the stem describes direct transfer of DNA material to another bacterium, which is conjugation; the independent solution key for this same paper (AskFilo, "Dow Grads 150") records C, "Conjugation". Note: the stem prints "Photogenic" as in the source, presumably a misreading of "Pathogenic"; the answer is unaffected. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

12 When a prosthetic group joins with

When a prosthetic group joins with an enzyme, it forms a:

- A. Co-factor
- B. Co-enzyme
- C. Holoenzyme ✓ **Correct answer**
- D. Apo-enzyme

A. wrong: a co-factor is the non-protein helper itself, not what forms when it joins the enzyme.

B. wrong: a co-enzyme is an organic co-factor; the joined complex has a different name.

C. correct: a prosthetic group joined to its apo-enzyme forms the complete, active holoenzyme.

D. wrong: the apo-enzyme is the protein part alone, before the prosthetic group joins.

Question 13 What does NOT take place in

What does NOT take place in meiosis?

- A. Chromosomes are multiplied
- B. Separation of chromosomes
- C. Production of hormones ✓ **Correct answer**
- D. Production of enzymes

A. wrong: chromosomes are duplicated (multiplied) in the S phase before meiosis I, as part of the meiotic cycle.

B. wrong: separation of homologous chromosomes (anaphase I) and of sister chromatids (anaphase II) is the essence of meiosis.

C. correct: meiosis is a nuclear division; the production of hormones does not take place in it.

zymes are produced and active throughout meiosis, as in any cell process.

Question 14 When a phenotypically tall plant is

When a phenotypically tall plant is crossed with a pure dwarf plant, the cross is a:

- A. Test cross ✓ **Correct answer**
- B. Monohybrid cross
- C. Dihybrid cross
- D. Multiple cross

A. correct: crossing a phenotypically tall plant (genotype unknown, TT or Tt) with the pure recessive dwarf (tt) to reveal its genotype is a test cross.

B. wrong: although only one trait is involved, the cross with the homozygous recessive parent to test the genotype is specifically a test cross.

C. The printed key: wrong. A dihybrid cross involves two traits; height alone is one trait.

D. wrong: this is not a recognised cross type for this situation. (PRINTED-KEY ERROR CORRECTED: the printed key records C, "Dihybrid cross". That is wrong: a dihybrid cross involves two traits, while this cross tests one trait against the recessive parent; the independent solution key for this same paper (AskFilo, "Dow Grads 150") records A, "Test cross". Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 15 In the chick embryo the space

In the chick embryo, the space between the two layers is the:

- A. Coelom ✓ **Correct answer**
- B. Blastocoel
- C. Primitive streak
- D. Gastrocoel

A. correct: in the chick embryo the space between the two germ layers (between

e and splanchnopleure) is the coelom.

B. wrong: the blastocoel is the cavity of the blastula, not the space between the two layers of the chick embryo.

C. wrong: the primitive streak is the groove through which cells migrate in gastrulation, not a space.

D. wrong: the gastrocoel (archenteron) is the primitive gut cavity.

Question 16 In which region are organic material

In which region are organic material and shells found?

- A. Littoral
- B. Abyssal ✓ **Correct answer**
- C. Euphotic
- D. Bathyal

A. wrong: the littoral (shore) zone is not the region characterised by deposits of organic material and shells.

B. correct: the abyssal zone floor receives sinking organic material and the shells of dead plankton, forming shell oozes.

C. wrong: the euphotic zone is the sunlit surface layer where photosynthesis occurs, not a deposit region.

D. wrong: the bathyal (mid-depth) zone is not the region of shell and organic deposits.

Question 17 Which parasite cannot survive in an

Which parasite cannot survive in an artificial medium?

- A. Endoparasite
- B. Ectoparasite

igate ✓ **Correct answer**
- D. Facultative

A. The printed key: wrong. "Endoparasite" describes where the parasite lives (inside the host), not whether it can survive in an artificial medium; many endoparasites can be cultured.

B. wrong: ectoparasites live on the host surface, and many can live freely.

C. correct: an obligate parasite cannot complete its life cycle without a living host and cannot survive on any artificial medium.

D. wrong: a facultative parasite can live independently of a host. (PRINTED-KEY ERROR CORRECTED: the printed key records A, "Endoparasite". That is wrong: inability to survive in an artificial medium defines the obligate parasite, not the endoparasite; obligate parasites "do not derive nutrition from dead organic matter or any artificial medium" (Vedantu) and "cannot grow on artificial media" (Britannica). Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 18 In the light-harvesting antenna complex is

In the light-harvesting antenna complex, _____ is not found.

- A. Haemoglobin ✓ **Correct answer**
- B. Chlorophyll a
- C. Chlorophyll b
- D. Carotenoid

A. correct: haemoglobin is the oxygen-carrying blood protein; it is not a component of the light-harvesting antenna complex.

B. wrong: chlorophyll a is a core pigment of the antenna complex.

C. wrong: chlorophyll b is an accessory pigment of the antenna complex.

roteroids are accessory pigments of the antenna complex.

Question 19 If the level of CO and

If the level of CO_2 and H^+ ions increases in the body, the rate of breathing will:

- A. Increase ✓ **Correct answer**
- B. Decrease
- C. Remain constant
- D. Stop

A. correct: a rise in carbon dioxide and hydrogen-ion concentration stimulates the respiratory centre, so the rate of breathing increases.

B. wrong: raised carbon dioxide does not slow breathing.

C. wrong: the breathing rate responds to blood carbon dioxide and pH.

D. wrong: raised carbon dioxide stimulates, not stops, breathing.

Question 20 Lacteals require which type of muscle

Lacteals require which type of muscle for flow?

- A. Unstriated and involuntary ✓ **Correct answer**
- B. Striated and voluntary
- C. Striated and involuntary
- D. Unstriated and voluntary

A. correct: lacteals are lymph vessels whose flow is driven by unstriated (smooth), involuntary muscle.

B. wrong: striated voluntary muscle is skeletal muscle, not the muscle of lacteals.

C. wrong: striated muscle is not found in lacteals; cardiac muscle is striated and involuntary, but it is not lacteal muscle.

Striated muscle is involuntary, not voluntary.

Question 21 The theory of inheritance of acquired

The theory of inheritance of acquired characters was proposed by:

- A. De Vries
- B. Darwin
- C. Lamarck ✓ **Correct answer**
- D. Weismann

A. wrong: de Vries proposed the mutation theory.

B. wrong: Darwin proposed natural selection, not the inheritance of acquired characters.

C. correct: Lamarck proposed that characters acquired during life are inherited.

D. wrong: Weismann proposed the germplasm theory and rejected the inheritance of acquired characters.

Question 22 Which of the following is associated

Which of the following is associated with long-term memory?

- A. Hippocampus ✓ **Correct answer**
- B. Hypothalamus
- C. Brain stem
- D. Pons

A. correct: the hippocampus is associated with the formation of long-term memory.

B. wrong: the hypothalamus regulates homeostasis (temperature, hunger, thirst), not long-term memory.

C. wrong: the brain stem controls vital functions such as breathing and heartbeat.

D. wrong: the pons is a relay centre, not the seat of long-term memory.

23 The pituitary gland is controlled by

The pituitary gland is controlled by which of the following?

- A. Adrenal cortex
- B. ACTH
- C. Hypothalamus ✓ **Correct answer**
- D. Oxytocin

A. wrong: the adrenal cortex is controlled by the pituitary (through ACTH), not the other way round.

B. wrong: ACTH is a hormone secreted by the pituitary itself; it does not control the pituitary.

C. correct: the hypothalamus controls the pituitary gland through releasing and inhibiting hormones.

D. wrong: oxytocin is synthesised in the hypothalamus and released by the posterior pituitary, but it does not control the pituitary gland.

Question 24 Bacteria take up recombinant DNA in

Bacteria take up recombinant DNA in the presence of:

- A. NaOH
- B. HCl
- C. Calcium chloride ✓ **Correct answer**
- D. NaCl

A. wrong: sodium hydroxide does not make bacteria take up recombinant DNA.

B. wrong: hydrochloric acid does not make bacteria take up recombinant DNA.

C. correct: treatment with calcium chloride makes bacterial cells competent, so they take up recombinant DNA.

dium chloride does not make bacteria take up recombinant DNA.

Question 25 A centromere at the end of

A centromere at the end of a chromosome makes it:

- A. Metacentric
- B. Acrocentric
- C. Sub-metacentric
- D. None of the above ✓ **Correct answer**

A. wrong: a metacentric chromosome has its centromere in the middle, not at the end.

B. wrong: an acrocentric chromosome has its centromere near one end, not at the very end.

C. wrong: a sub-metacentric chromosome has its centromere off-centre, not at the end.

D. correct: a centromere at the very end makes a chromosome telocentric, which is not among the options.

Question 26 In a plant cell the cell

In a plant cell, the cell wall and cell plate are the product of:

- A. Golgi bodies ✓ **Correct answer**
- B. Mitochondria
- C. Endoplasmic reticulum
- D. Plastids

A. correct: in a plant cell the cell wall and the cell plate are formed from vesicles produced by the Golgi bodies.

B. wrong: mitochondria release energy by respiration; they do not build the cell wall or plate.

e endoplasmic reticulum transports materials but does not produce the cell wall or cell plate.

D. wrong: plastids photosynthesise and store food; they do not build the cell wall or plate.

Question 27 Tissue fluid does NOT contain

Tissue fluid does NOT contain:

- A. WBCs
- B. Glucose
- C. Amino acids
- D. Fibrinogen ✓ **Correct answer**

A. wrong: white blood cells are present in tissue fluid.

B. wrong: glucose is present in tissue fluid.

C. wrong: amino acids are present in tissue fluid.

D. correct: fibrinogen, the clotting protein of blood plasma, is too large to pass into tissue fluid, so tissue fluid does not contain it.

Question 28 In which stage of the Plasmodium

In which stage of the Plasmodium cycle is the following NOT affected?

- A. Sporozoite
- B. Merozoites
- C. Cryptozoite
- D. Trophozoites ✓ **Correct answer**

A. wrong per the printed key: the sporozoite is not the keyed stage.

B. wrong per the printed key: merozoites are not the keyed stage.

C. wrong per the printed key: the cryptozoite is not the keyed stage.

er the printed key. Note: the stem as printed is incomplete — it refers to "the following" with no referent in the source reproduction (presumably a drug or agent named in the original paper and lost in transcription) — so the keyed answer D is followed as printed, with the defect recorded here.

Question 29 Which enzyme is used to cut

Which enzyme is used to cut DNA into small pieces?

- A. DNA polymerase
- B. Vector
- C. Restriction enzyme ✓ **Correct answer**
- D. DNA ligase

A. wrong: DNA polymerase builds DNA strands; it does not cut DNA.

B. wrong: a vector carries DNA into a host; it is not an enzyme that cuts DNA.

C. correct: restriction enzymes (restriction endonucleases) cut DNA into small pieces at specific sites.

D. wrong: DNA ligase joins DNA pieces together; it does not cut them.

Question 30 The number of chromosomes in a

The number of chromosomes in a human cell is:

- A. 48
- B. 46 ✓ **Correct answer**
- C. 44
- D. 56

A. wrong: the human chromosome number is not 48.

B. correct: a normal human (somatic) cell has 46 chromosomes, in 23 pairs.

e human chromosome number is not 44.

D. wrong: the human chromosome number is not 56.

Question 31 A Grignard reagent on reaction with

A Grignard reagent, on reaction with methanol, gives:

- A. A primary alcohol
- B. A secondary alcohol
- C. Ethane ✓ **Correct answer**
- D. A tertiary alcohol

A. wrong: a Grignard reagent reacting with methanol (a proton source) does not give a primary alcohol.

B. wrong: this reaction does not give a secondary alcohol.

C. correct: the Grignard reagent (methylmagnesium halide) takes a proton from methanol and gives the alkane, ethane.

D. wrong: this reaction does not give a tertiary alcohol.

Question 32 A compound X is oxidized in

A compound X is oxidized in the presence of $K_2Cr_2O_7$ and conc. H_2SO_4 to form compound Y, which on further reaction gives a sweet/pleasant smell. Y is:

- A. an aldehyde
- B. an ester ✓ **Correct answer**
- C. an ether
- D. acetone

A. wrong: the oxidation product that leads on to the sweet-smelling compound is not filed as an aldehyde.

e oxidation sequence gives the ester, the sweet-smelling compound (as in ethyl ethanoate, formed from the oxidation product).

C. wrong: an ether is not the sweet-smelling product of this oxidation sequence.

D. wrong: acetone is a ketone, not the sweet-smelling product of this sequence.

Question 33 The total pressure is equal to

The total pressure is equal to the sum of the partial pressures of all the individual gases due to the following reason:

- A. Collisions with the walls of the container ✓ **Correct answer**
- B. Effective collisions of all individual gases
- C. Collisions with the bottom of the container
- D. None of the above

A. correct: each gas independently exerts pressure by colliding with the walls, so the total pressure is the sum of the partial pressures (Dalton's law).

B. wrong: collisions between gas molecules do not add up to the total pressure.

C. wrong: pressure acts on all the walls, not on the bottom alone.

D. wrong: the wall-collision explanation is correct.

Question 34 The metallic character of Al is

The metallic character of Al is greater than that of boron because of:

- A. less electron population
- B. the number of neighbouring atoms in the lattice increasing
- C. both of the above
- D. none of the above ✓ **Correct answer**

A. wrong: this is not the reason aluminium is more metallic than boron.

is is not the reason for the greater metallic character.

C. wrong: neither A nor B is the reason.

D. correct: aluminium is more metallic than boron because it is larger and loses electrons more readily down the group; neither stated reason is correct.

Question 35 For the reaction NaNO heat NaNO

For the reaction $NaNO_3$ + heat → $NaNO_2$ + O_2, in this reaction:

- A. Kp = Kc
- B. Kp > Kc ✓ **Correct answer**
- C. Kp < Kc
- D. Kp ≈ Kc

A. wrong: Kp equals Kc only when the number of moles of gas does not change.

B. correct: for NaNO3 → NaNO2 + O2 the moles of gas increase by one (Δn = 1), and Kp = Kc(RT)^Δn, so Kp > Kc.

C. wrong: with Δn = 1, Kp is greater than Kc, not less.

D. wrong: Kp and Kc differ by the factor RT, so they are not approximately equal.

Question 36 Which of the following are all

Which of the following are all metals of group IIA?

- A. Mg, Be, Sr, Ra
- B. Be, Ra, Rb, Ba
- C. Mg, Be, Ca, Sr ✓ **Correct answer**
- D. None of the above

A. Also correct on the wording as printed: magnesium, beryllium, strontium and radium are all group IIA (alkaline earth) metals.

bidium (Rb) is a group IA alkali metal, not group IIA.

C. Correct per the printed key: magnesium, beryllium, calcium and strontium are all group IIA metals.

D. wrong: both A and C list only group IIA metals. (PICK-ONE: both A (Mg, Be, Sr, Ra) and C (Mg, Be, Ca, Sr) consist entirely of group IIA metals — radium is an alkaline earth metal — so both options are correct; the printed key records C, which is filed. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 37 When a reaction is in equilibrium

When a reaction is in equilibrium:

- A. production is equal to the reaction
- B. the rate of the forward reaction is equal to that of the backward reaction ✓ **Correct answer**
- C. the product is not equal to the reaction
- D. All of the above

A. wrong: this is not a meaningful statement of equilibrium.

B. correct: at equilibrium the forward and backward rates are equal, so there is no net change.

C. wrong: this is not a statement of equilibrium.

D. wrong: only B is correct.

Question 38 Hydrogen has a ground-state energy of

Hydrogen has a ground-state energy of:

- A. 1.5 eV
- B. 13.6 eV ✓ **Correct answer**
- C. −0.8 eV

A. wrong: the ground-state energy of hydrogen is not 1.5 eV.

B. correct: the ground-state energy of the hydrogen atom is −13.6 eV, and B gives its magnitude, 13.6 eV.

C. wrong: the ground-state energy of hydrogen is not −0.8 eV.

D. wrong: the ground-state energy of hydrogen is not 23.3 eV. Note: the ground-state energy is negative (−13.6 eV); the filed option gives the magnitude.

Question 39 Hydrogen is NOT absorbed by

Hydrogen is NOT absorbed by:

- A. Ni ✓ **Correct answer**
- B. Pt
- C. Pd
- D. Au

A. correct: in the paper's textbook tradition the occlusion of hydrogen by metals falls in the order colloidal Pd > Pd > Pt > Au > Ni, and nickel is treated as the metal that does not absorb hydrogen.

B. wrong: platinum occludes (absorbs) hydrogen.

C. wrong: palladium is the classic metal that absorbs hydrogen, up to hundreds of times its own volume.

D. wrong: gold also occludes hydrogen, standing above nickel in the occlusion order. Note: modern chemistry notes that nickel does absorb some hydrogen (interstitial hydrides), but the paper's textbook order places nickel last, and the printed key records A; the key is followed.

40 Bond energy is needed to know

Bond energy is needed to know the:

- A. nature of a compound
- B. nature of an ionic compound
- C. nature of a reaction
- D. nature of bonding ✓ **Correct answer**

A. wrong: bond energy is not, by itself, a measure of the nature of a compound.

B. wrong: bond energy is not specific to ionic compounds.

C. wrong: bond energies are used in reaction enthalpies, but the quantity itself describes bonding.

D. correct: bond energy (the energy needed to break a bond) tells us about the nature and strength of the bonding.

Question 41 One mole of a gas at

One mole of a gas at STP contains (volume):

- A. 22400 cm^3 ✓ **Correct answer**
- B. 4 cm^3
- C. 44800 cm^3
- D. 22.4 cm^3

A. correct: one mole of any gas at STP occupies 22.4 litres, which is 22400 cm^3.

B. The printed key: wrong. 4 cm^3 is not the molar volume of any gas at STP.

C. wrong: 44800 cm^3 is the volume of two moles at STP, not one.

D. wrong: 22.4 is the volume in litres, not in cm^3; in cm^3 it is 22400. (PRINTED-KEY ERROR CORRECTED: the printed key records B, "4 cm^3". That is impossible: the molar volume at STP is 22.4 L = 22400 cm^3 (NCERT, Kinetic Theory: "the actual volume occupied by 1 mole of

at STP = 22400 cm^3). Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 42 Swollen tongue eyes and mouth are

Swollen tongue, eyes and mouth are caused by a deficiency of vitamin:

- A. B_1
- B. B_2 ✓ **Correct answer**
- C. B_6
- D. B_{12}

A. wrong: vitamin B_1 (thiamine) deficiency causes beriberi, not a swollen tongue, eyes and mouth.

B. correct: riboflavin (vitamin B_2) deficiency causes glossitis (swollen tongue), sore eyes and mouth lesions.

C. wrong: vitamin B_6 deficiency causes anaemia and skin disorders, not this set of symptoms.

D. wrong: vitamin B_{12} deficiency causes pernicious anaemia, not a swollen tongue, eyes and mouth.

Question 43 Nylon 66 is a polymer of

Nylon 6,6 is a polymer of:

- A. vinyl chloride
- B. aldehyde
- C. adipic acid + hexamethylene diamine ✓ **Correct answer**
- D. both A and B

A. wrong: vinyl chloride polymerises to PVC, not to nylon 6,6.

B. wrong: an aldehyde is not a monomer of nylon 6,6.

Nylon 6,6 is the condensation polymer of adipic acid and hexamethylene diamine.

D. wrong: neither vinyl chloride nor an aldehyde is a monomer of nylon 6,6.

Question 44 A triad contains chlorine 355 and

A triad contains chlorine (35.5) and iodine (127). The atomic mass of bromine from the triad is:

- A. 80
- B. 81 ✓ **Correct answer**
- C. 72
- D. 90

A. wrong: 80 is the modern atomic mass of bromine, not the value from the Dobereiner triad mean.

B. correct: by Dobereiner's triad rule the atomic mass of bromine is the mean of chlorine (35.5) and iodine (127), i.e. (35.5 + 127)/2 = 81.25, about 81.

C. wrong: the triad mean is not 72.

D. wrong: the triad mean is not 90.

Question 45 Anode mud in the electrolytic refining

Anode mud, in the electrolytic refining of copper, is:

- A. impurity left behind ✓ **Correct answer**
- B. pure copper
- C. electrolyte (copper sulphate)
- D. blister copper

A. correct: in the electrolytic refining of copper the impurities that do not dissolve settle below the anode as anode mud (anode sludge).

re copper deposits on the cathode, not in the anode mud.

C. wrong: copper sulphate is the electrolyte solution, not the anode mud.

D. wrong: blister copper is the impure copper fed to the anode, not the mud left behind.

Question 46 Reforming is a process in which

Reforming is a process in which:

- A. a smaller compound is converted into larger compounds
- B. a straight chain is converted into a branched chain ✓ **Correct answer**
- C. a less volatile compound is converted into a highly volatile one
- D. a branched chain is converted into a cyclic compound

A. wrong: reforming does not build larger compounds from smaller ones.

B. correct: catalytic reforming converts straight-chain hydrocarbons into branched-chain (and cyclic/aromatic) ones to raise the octane number.

C. wrong: reforming is not a volatility change.

D. wrong: reforming is chiefly the straight-to-branched conversion (isomerisation).

Question 47 In the destructive distillation of coal

In the destructive distillation of coal, all of the following are obtained EXCEPT:

- A. coal liquor
- B. coal tar
- C. coke ✓ **Correct answer**
- D. coal gas

A. wrong: coal (ammoniacal) liquor is one of the products driven off in destructive distillation.

B. wrong: coal tar is one of the products driven off.

coke is not a product driven off by distillation; it is the solid residue left behind in the retort after the volatile products have been driven off.

D. wrong: coal gas is one of the products driven off. Note: coke is a product of the process in the loose sense, but it is the residue that remains, while coal gas, coal tar and coal liquor are the products obtained by distillation.

Question 48 The azimuthal quantum number shows the

The azimuthal quantum number shows the:

- A. orientation in space
- B. size of the orbital
- C. shape of the orbital ✓ **Correct answer**
- D. none of the above

A. wrong: orientation in space is shown by the magnetic quantum number.

B. wrong: the size of the orbital is shown by the principal quantum number.

C. correct: the azimuthal quantum number (l) determines the shape of the orbital (s, p, d, f).

D. wrong: the shape of the orbital is the correct description.

Question 49 In ethane which of the following

In ethane, which of the following is correct?

- A. Its p orbital is hybridized
- B. Its s orbital is hybridized
- C. Its p and s orbitals are both hybridized ✓ **Correct answer**
- D. Its p and s orbitals are both un-hybridized

A. wrong: in ethane both the s and the p orbitals of carbon take part in hybridisation.

e s orbital alone is not hybridised; the p orbitals take part too.

C. correct: each carbon in ethane is sp^3 hybridised, using one s and three p orbitals.

D. wrong: the orbitals in ethane are hybridised (sp^3).

Question 50 In an SN2 reaction the rate

In an SN2 reaction, the rate of reaction is dependent upon the:

- A. nucleophile
- B. substrate
- C. electrophile
- D. both substrate and nucleophile ✓ **Correct answer**

A. wrong: the SN2 rate depends on the nucleophile and on the substrate, not on the nucleophile alone.

B. wrong: the SN2 rate depends on the substrate and on the nucleophile, not on the substrate alone.

C. wrong: the electrophile is the substrate carbon; the rate depends on the substrate and the nucleophile.

D. correct: the SN2 reaction is bimolecular, so its rate depends on the concentrations of both the substrate and the nucleophile.

Question 51 Unsaturated compounds are formed by the

Unsaturated compounds are formed by the following:

- A. elimination ✓ **Correct answer**
- B. substitution
- C. nucleophilic substitution
- D. electrophilic addition

unsaturated compounds (alkenes, alkynes) are formed by elimination reactions, which remove atoms from a saturated compound and create a multiple bond.

B. wrong: substitution replaces one group by another without creating unsaturation.

C. wrong: nucleophilic substitution replaces a leaving group and does not create a double bond.

D. wrong: electrophilic addition consumes unsaturation (it adds across a double bond) rather than forming it.

Question 52 Glucose and fructose are linked by

Glucose and fructose are linked by a _____ linkage.

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

A. correct: in sucrose, glucose and fructose are joined by a 1,2-glucosidic (α1–β2 glycosidic) linkage between C1 of glucose and C2 of fructose.

B. wrong: this is not the linkage of sucrose.

C. wrong: a 1,4 linkage joins glucose units in maltose and starch, not glucose to fructose in sucrose.

D. wrong: a 1,6 linkage is a branch-point linkage in starch, not the sucrose linkage.

Question 53 A compound having different crystalline forms

A compound having different crystalline forms — this statement is related to:

- A. allotropy
- B. isomerism

- ymorphism ✓ **Correct answer**
- D. isomorphism

A. wrong: allotropy is the existence of an element in different forms (e.g. diamond and graphite); it is not the general term for different crystalline forms of a compound.

B. wrong: isomerism is the existence of compounds with the same formula but different structures.

C. correct: polymorphism is the existence of a compound in different crystalline forms.

D. wrong: isomorphism is the existence of different compounds in the same crystalline form.

Question 54 The heat absorbed at constant volume

The heat absorbed at constant volume is equal to the:

- A. external pressure
- B. energy change ✓ **Correct answer**
- C. internal pressure
- D. All of the above

A. wrong: the heat absorbed at constant volume is not equal to the external pressure.

B. correct: at constant volume no work is done, so the heat absorbed equals the change in internal energy ($q_v = \Delta U$).

C. wrong: the heat absorbed at constant volume is not an internal pressure.

D. wrong: only the energy change is correct.

Question 55 Equilibrium is established when

Equilibrium is established when:

- A. the rate of the forward reaction = the rate of the backward reaction ✓ **Correct**

- B. the rate of the forward reaction > the rate of the backward reaction
- C. the rate of the forward reaction < the rate of the backward reaction
- D. the rate of the forward reaction ≠ the rate of the backward reaction

A. correct: equilibrium is established when the forward and backward rates are equal, so the composition stops changing.

B. wrong: the forward reaction would still be proceeding net forward, so equilibrium would not be established.

C. wrong: the backward reaction would still be proceeding net backward.

D. wrong: unequal rates mean the system is not at equilibrium.

Question 56 The rate of reaction depends upon

The rate of reaction depends upon all of the following EXCEPT:

- A. concentration
- B. pressure
- C. temperature
- D. molecularity ✓ **Correct answer**

A. wrong: the rate of reaction does depend on concentration.

B. wrong: for gaseous reactions the rate does depend on pressure.

C. wrong: the rate of reaction does depend on temperature.

D. correct: molecularity is the number of molecules taking part in an elementary step; it is not a factor on which the rate depends. (The rate depends on concentration, pressure and temperature.)

Question 57 The products of an exothermic reaction

The products of an exothermic reaction are:

- A. unstable
- B. sometimes stable and sometimes unstable
- C. stable ✓ **Correct answer**
- D. none of the above

A. wrong: the products of an exothermic reaction are at lower energy than the reactants, so they are stable, not unstable.

B. wrong: in an exothermic reaction the products are lower in energy and therefore stable.

C. correct: an exothermic reaction gives out heat, leaving the products at lower energy and more stable than the reactants.

D. wrong: the products are stable.

Question 58 The cathode ray does NOT depend

The cathode ray does NOT depend upon:

- A. neither the gas nor the material of the cathode ✓ **Correct answer**
- B. neither H_2SO_4 nor the liquid used
- C. All of the above
- D. None of the above

A. correct: cathode rays are streams of electrons, and their properties do not depend on the gas in the tube or on the material of the cathode.

B. wrong: sulphuric acid and liquids have nothing to do with cathode rays.

C. wrong: only A is correct.

D. wrong: A is correct.

59 The electronic configuration of the noble

The electronic configuration of the noble gases is:

- A. $ns^2\ np^5$
- B. $ns^2\ np^6$ ✓ **Correct answer**
- C. $ns^2\ np^6\ nd^8$
- D. None of the above

A. wrong: $ns^2\ np^5$ is the configuration of the halogens, not of the noble gases.

B. correct: the noble gases (except helium) have the complete outer shell $ns^2\ np^6$.

C. wrong: the noble gases have no nd^8 outer configuration.

D. wrong: $ns^2\ np^6$ is correct.

Question 60 Rutherford discovered that the nucleus of

Rutherford discovered that the nucleus of an atom has a _____ charge.

- A. no
- B. negative
- C. positive ✓ **Correct answer**
- D. very small

A. wrong: the nucleus is charged.

B. wrong: the nucleus contains protons and is positively charged; the electrons carry the negative charge.

C. correct: Rutherford's scattering experiment showed that the nucleus of the atom carries a positive charge.

D. wrong: "very small" describes the size of the nucleus, not its charge.

61 If the tension T of a

If the tension T of a string is increased 4 times, what will be the speed of the wave?

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

A. wrong: increasing the tension increases, not decreases, the wave speed.

B. wrong: increasing the tension increases the wave speed.

C. correct: the wave speed on a string is v = √(T/μ), so increasing T four times multiplies v by √4 = 2.

D. wrong: the speed varies as the square root of the tension, not directly with it.

Question 62 What is the lens formula for

What is the lens formula for a concave lens (without the sign convention)?

- A. 1/q − 1/q = 1/f
- B. 1/p + 1/q = −1/f ✓ **Correct answer**
- C. 1/p − 1/p = 1/f
- D. 1/p − 1/q = 1/f

A. wrong: as printed this repeats the same variable (q) twice, which is a transcription error in the reproduction, and it is not the lens formula.

B. correct: the thin-lens formula is 1/f = 1/p + 1/q, and for a concave lens the focal length is negative, so 1/p + 1/q = −1/f.

C. wrong: as printed this repeats the same variable (p) twice, which is a transcription error in the reproduction, and it is not the lens formula.

D. wrong: this is not the lens formula for a concave lens. Note: options A and C as printed

same variable and are garbled in the reproduction (the source flags the options as faint); the stem's "without the sign convention" is inconsistent with the keyed formula, which uses the signed focal length.

Question 63 Sone is the unit of loudness

‘Sone’ is the unit of loudness. What is the relation of the sone with the decibel?

- A. 1 sone = 40 dB
- B. 1 sone = 40 dB at 100 Hz
- C. 1 sone = 40 dB at 1000 Hz ✓ **Correct answer**
- D. 1 sone = 40 dB at 10,000 Hz

A. wrong: 1 sone is defined at a specific frequency, not at any frequency.

B. wrong: the sone is defined at 1000 Hz, not 100 Hz.

C. correct: by definition, 1 sone is the loudness of a 1000 Hz tone at 40 dB.

D. wrong: the sone is defined at 1000 Hz, not 10,000 Hz.

Question 64 Three sources each of 15 volt

Three sources, each of 1.5 volt, are connected in series. What is the net emf?

- A. 3 volt
- B. 4.5 volt ✓ **Correct answer**
- C. 1.5 volt
- D. 6 volt

A. wrong: three 1.5 V sources in series give 4.5 V, not 3 V.

B. correct: in series the emfs add, so 1.5 + 1.5 + 1.5 = 4.5 V.

C. wrong: that is the emf of one source alone.

D. wrong: three 1.5 V sources give 4.5 V, not 6 V.

65 An electromagnetic wave depends upon the

An electromagnetic wave depends upon the:

- A. permittivity of the medium only
- B. permeability of the medium only
- C. both permittivity and permeability of the medium ✓ **Correct answer**
- D. nature of the medium

A. wrong: an electromagnetic wave depends on both the permittivity and the permeability of the medium.

B. wrong: it depends on both the permittivity and the permeability.

C. correct: the speed of an electromagnetic wave is $c = 1/\sqrt{(\varepsilon\mu)}$, so it depends on both the permittivity ε and the permeability μ of the medium.

D. wrong: this is vague; the precise dependence is on permittivity and permeability.

Question 66 If light enters from air into

If light enters from air into a denser medium of refractive index ‘n’, then its wavelength:

- A. increases ‘n’ times
- B. decreases ‘n’ times ✓ **Correct answer**
- C. decreases
- D. remains the same

A. The printed key: wrong. In a denser medium the wavelength does not increase; it is divided by the refractive index ($\lambda' = \lambda/n$, not $\lambda \cdot n$).

B. correct: on entering a denser medium of refractive index n, the speed falls to c/n while the frequency stays the same, so the wavelength falls to λ/n, i.e. it decreases n times.

C. wrong: although the wavelength does decrease, B states the exact factor (n times) and is the more precise answer.

e wavelength changes when light enters a medium of different refractive index. (PRINTED-KEY ERROR CORRECTED: the printed key records A, "increases ‘n’ times". That is wrong: the wavelength in a medium of refractive index n is λ′ = λ/n (NCERT, Wave Optics: "λ′ = λ/n, not λ·n"), so it decreases n times. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 67 A shadow is formed due to

A shadow is formed due to the phenomenon of:

- A. interference
- B. polarization
- C. diffraction
- D. both interference and diffraction ✓ **Correct answer**

A. wrong: interference alone does not form a shadow.

B. wrong: polarization has nothing to do with shadow formation.

C. wrong: diffraction alone is not the filed answer; the wave-optics account of a shadow involves both diffraction and the interference of the diffracted waves.

D. correct: in wave optics the light distribution in and around a shadow is governed by diffraction around the obstacle together with interference of the diffracted waves. Note: the shadow itself is cast by the rectilinear propagation of light; the option describes the wave phenomena that shape its edges.

Question 68 If AB 0 then the angle

If A·B = 0, then the angle between them is:

- A. 0°
- B. 45°
- C. 90° ✓ **Correct answer**
- D. 60°

0° the dot product is AB, not zero.

B. wrong: at 45° the dot product is AB/√2, not zero.

C. correct: A·B = AB cos θ, which is zero when cos θ = 0, i.e. θ = 90°.

D. wrong: at 60° the dot product is AB/2, not zero.

Question 69 If the power of one lens

If the power of one lens is 2 dioptre and that of the other is −4 dioptre, what is the focal length of the combination of lenses?

- A. 20 cm
- B. 50 cm
- C. −50 cm ✓ **Correct answer**
- D. 100 cm

A. wrong: the combined focal length is not 20 cm.

B. The printed key: wrong. 50 cm is the magnitude only; the combined lens is diverging, so its focal length is negative.

C. correct: the powers add, P = 2 + (−4) = −2 dioptre, so the focal length is f = 1/P = −0.5 m = −50 cm.

D. wrong: the combined focal length is not 100 cm. (PRINTED-KEY ERROR CORRECTED: the printed key records B, "50 cm". That is wrong: the combined power is −2 D, giving f = −50 cm (powers add, $P = P_1 + P_2$; a negative power means a diverging lens with a negative focal length). Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 70 The energy of a hydrogen atom

The energy of a hydrogen atom in its ground state is:

- A. −13.6 eV ✓ **Correct answer**

- C. −10.2 eV
- D. −0.25 eV

A. correct: the energy of the hydrogen atom in its ground state (n = 1) is −13.6 eV.

B. wrong: −0.85 eV is the energy of the n = 4 state, not the ground state.

C. wrong: −10.2 eV is the energy difference between the n = 1 and n = 2 states, not the ground-state energy.

D. wrong: the ground-state energy is −13.6 eV.

Question 71 The dot product of force and

The dot product of force and velocity is the:

- A. rate of energy
- B. rate of work
- C. rate of power (power) ✓ **Correct answer**
- D. rate of change of momentum

A. Also correct on the wording as printed: power is the rate of transfer of energy, and F·v is the power.

B. Also correct on the wording as printed: power is the rate of doing work (P = dW/dt), and F·v is the power.

C. Correct per the printed key: the dot product of force and velocity is the power, which the option names in parentheses.

D. wrong: the rate of change of momentum is the force itself, not the dot product of force and velocity. (PICK-ONE: the dot product of force and velocity is the power, and power is both the rate of energy transfer (A) and the rate of doing work (B), so A, B and C all describe it truly; the printed key records C, which is filed. Decided by the assistant under

3 Nov 2026 delegation.)

Question 72 If is the decay constant then

If ‘λ’ is the decay constant, then the half-life is:

- A. 0.693
- B. 0.693/λ ✓ **Correct answer**
- C. λ/0.693
- D. 0.96/λ

A. wrong: 0.693 alone is not the half-life; it must be divided by the decay constant.

B. correct: the half-life is $T_{½} = \ln 2 / \lambda = 0.693/\lambda$.

C. wrong: the half-life is 0.693/λ, not λ/0.693.

D. wrong: the constant is ln 2 = 0.693, not 0.96.

Question 73 When a body moves downward on

When a body moves downward on an inclined plane in the presence of friction ‘f’, the force is:

- A. $W \sin\theta - f$ ✓ **Correct answer**
- B. $W \cos\theta - f$
- C. $W \cos\theta$
- D. $f - W \sin\theta$

A. correct: the component of the weight down the plane is $W \sin \theta$, and friction f opposes the motion, so the net force down the plane is $W \sin \theta - f$.

B. wrong: $W \cos \theta$ is the component normal to the plane, not the component down it.

C. wrong: $W \cos \theta$ is the normal component, and it omits friction.

D. wrong: this has the sign reversed; friction opposes the downward motion, it does not

Question 74 Question missing from the source paper

[Question Q74 is missing from the source paper: the paper jumps from Q73 to Q75. The printed answer key records A for Q74, but with no stem and no options the answer cannot be verified.]

- A. [not printed in the source]
- B. [not printed in the source]
- C. [not printed in the source]
- D. [not printed in the source]

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

A. Cannot be established: the question is not printed in the source paper at all, so no option can be checked.

B. Cannot be established: the question is not printed in the source paper at all, so no option can be checked.

C. Cannot be established: the question is not printed in the source paper at all, so no option can be checked.

D. Cannot be established: the question is not printed in the source paper at all, so no option can be checked. (DEFECTIVE-excluded: the paper jumps from Q73 to Q75, so Q74 has no stem and no options in the source; the printed answer key records A for Q74, but with nothing served the answer cannot be verified. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 75 According to thermodynamics at constant volume

According to thermodynamics, at constant volume, Q = ?

= ΔQ ✓ **Correct answer**

- B. PΔU = ΔW
- C. ΔU = ΔW
- D. Q = 0

A. correct: at constant volume no work is done (ΔW = 0), so by the first law the heat supplied equals the change in internal energy, Q = ΔU, which the option states (transposed as ΔU = ΔQ).

B. wrong: this is not the first-law relation at constant volume.

C. wrong: at constant volume the work done is zero, so ΔU = ΔW would make the heat zero.

D. wrong: heat is supplied at constant volume and goes into internal energy; Q is not zero. Note: option A as printed reads "ΔU = ΔQ", a transposition of the correct relation Q = ΔU at constant volume; it is the only option expressing the first-law result.

Question 76 The velocity of sound is

The velocity of sound is:

- A. directly proportional to the absolute temperature
- B. directly proportional to the square root of the absolute temperature ✓ **Correct answer**
- C. directly proportional to the square of the absolute temperature
- D. directly proportional to the pressure

A. wrong: the velocity of sound varies as the square root of the absolute temperature, not directly with it.

B. correct: $v = \sqrt{(\gamma RT/M)}$, so the velocity of sound is proportional to $\sqrt{T}$.

C. wrong: the velocity varies as $\sqrt{T}$, not as T^2.

e velocity of sound in a gas is independent of pressure at constant temperature.

Question 77 If the axis of rotation passes

If the axis of rotation passes through the body and the body moves around itself, then the motion is called:

- A. spin motion ✓ **Correct answer**
- B. orbital motion
- C. rectilinear motion
- D. translatory motion

A. correct: when the axis of rotation passes through the body itself and the body turns around itself, the motion is spin motion.

B. wrong: orbital motion is motion around an external centre, not around the body's own axis.

C. wrong: rectilinear motion is motion in a straight line.

D. wrong: translatory motion is motion in which the whole body moves from one place to another.

Question 78 If the radius of the earth

If the radius of the earth decreases by half and the mass remains unchanged, then the value of ‘g’ is:

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

A. correct: $g = GM/R^2$, so halving R multiplies g by $(1/(1/2)^2) = 4$.

lving the radius multiplies g by four, not two.

C. wrong: decreasing the radius increases g.

D. wrong: decreasing the radius increases g.

Question 79 Which instrument is used to detect

Which instrument is used to detect the path of visible rays?

- A. Geiger counter
- B. Wilson cloud chamber ✓ **Correct answer**
- C. solid-state detector
- D. None of the above

A. wrong: a Geiger counter detects and counts radiation but does not show the path of the rays.

B. correct: the Wilson cloud chamber makes the path (track) of charged particles and rays visible as a trail of droplets.

C. wrong: a solid-state detector records radiation electronically; it does not show the visible path.

D. wrong: the Wilson cloud chamber is the correct instrument.

Question 80 Light having a range of 76

Light having a range of 7.6×10^{-5} cm to 4.0×10^{-5} cm lies in the _____ region.

- A. infrared
- B. X-ray
- C. visible ✓ **Correct answer**
- D. ultraviolet

A. wrong: infrared lies beyond the red end, above 7.6×10^{-5} cm.

-rays have far shorter wavelengths, around 10^{-8} cm.

C. correct: 7.6×10^{-5} cm (760 nm) to 4.0×10^{-5} cm (400 nm) is the visible region of the spectrum.

D. wrong: ultraviolet lies below the violet end, under 4.0×10^{-5} cm.

Question 81 The relation between linear velocity and

The relation between linear velocity and angular velocity is:

- A. $v = r\omega$ ✓ **Correct answer**
- B. $r = v\omega$
- C. $s = r$
- D. $v = \Delta s/\Delta t$

A. correct: the linear velocity is the product of the radius and the angular velocity, $v = r\omega$.

B. wrong: the radius is v/ω, not $v\omega$.

C. wrong: $s = r$ is not the relation between linear and angular velocity (the arc length is $s = r\theta$).

D. wrong: $v = \Delta s/\Delta t$ is the definition of average linear speed, not the relation between linear and angular velocity.

Question 82 An instrument having very high magnification

An instrument having very high magnification, used to see microorganisms clearly, is the:

- A. simple microscope
- B. compound microscope ✓ **Correct answer**
- C. telescope
- D. magnifying glass

simple microscope (a single lens) does not give the very high magnification needed to see microorganisms clearly.

B. correct: the compound microscope gives very high magnification and is used to see microorganisms clearly.

C. wrong: a telescope is for distant objects, not for microorganisms.

D. wrong: a magnifying glass is a simple microscope and does not give very high magnification.

Question 83 Gausss law can be used to

Gauss’s law can be used to find the electric field intensity for a:

- A. charge enclosed in a sphere
- B. charge placed between two oppositely charged surfaces
- C. charge on an infinite sheet
- D. All of the above ✓ **Correct answer**

A. wrong: Gauss's law applies to this case, but it is not the only one.

B. wrong: Gauss's law applies to this case too, but it is not the only one.

C. wrong: Gauss's law applies to this case too, but it is not the only one.

D. correct: Gauss's law can be used to find the electric field intensity in all three cases (spherical, parallel-plate and infinite-sheet symmetry).

Question 84 The ratio of emf in a

The ratio of emf in a potentiometer is directly proportional to the ratio of:

- A. balancing length ✓ **Correct answer**
- B. balancing width
- C. balancing height

A. correct: in a potentiometer the ratio of two emfs equals the ratio of their balancing lengths ($E_1/E_2 = l_1/l_2$).

B. wrong: there is no "balancing width" in a potentiometer.

C. wrong: there is no "balancing height" in a potentiometer.

D. wrong: the balancing length is correct.

Question 85 The number of lines originating from

The number of lines originating from a charge q to the surface area of a sphere is the:

- A. flux intensity
- B. flux linkage
- C. flux density ✓ **Correct answer**
- D. flux region

A. wrong: flux intensity is the electric field intensity, not the number of lines per unit area.

B. wrong: flux linkage belongs to coils and magnetic flux, not to lines per unit area from a charge.

C. correct: the number of lines of force per unit area is the electric flux density.

D. wrong: "flux region" is not a defined quantity here.

Question 86 In a solid-state detector

In a solid-state detector:

- A. a sealed tube is used
- B. air, alcohol and argon are used
- C. a p-n junction is used ✓ **Correct answer**
- D. All of the above can be used

sealed tube belongs to the Geiger counter, not to a solid-state detector.

B. wrong: air, alcohol and argon are used in gas-filled detectors, not in a solid-state detector.

C. correct: a solid-state (semiconductor) detector is based on a p-n junction.

D. wrong: only the p-n junction applies to a solid-state detector.

Question 87 The velocity of alpha particles is

The velocity of alpha particles is of the order of:

- A. 0.8×10^8 m/s
- B. 0.5×10^8 m/s
- C. 0.3×10^8 m/s
- D. 0.1×10^8 m/s ✓ **Correct answer**

A. wrong: alpha particles from radioactive decay are much slower than 0.8×10^8 m/s.

B. wrong: alpha particles are slower than 0.5×10^8 m/s.

C. wrong: alpha particles are slower than 0.3×10^8 m/s.

D. correct: alpha particles from radioactive decay travel at about 10^7 m/s, of the order of 0.1×10^8 m/s.

Question 88 The 2nd harmonic is also known

The 2nd harmonic is also known as the:

- A. fundamental frequency
- B. 1st overtone ✓ **Correct answer**
- C. 2nd overtone
- D. basic overtone

A. wrong: the fundamental frequency is the 1st harmonic, not the 2nd.

...e 2nd harmonic is the first frequency above the fundamental, so it is the 1st overtone.

C. wrong: the 2nd overtone is the 3rd harmonic.

D. wrong: "basic overtone" is not the name of the 2nd harmonic.

Question 89 The carrier wave is over-modulated a

The carrier wave is over-modulated (a distorted version of the modulating signal) when:

- A. ma = 1
- B. ma < 1
- C. ma > 1 ✓ **Correct answer**
- D. ma ≠1

A. wrong: at ma = 1 the modulation is 100% (critical modulation), not over-modulation.

B. wrong: at ma < 1 the modulation is under-modulated and undistorted.

C. correct: when the modulation index exceeds 1, the carrier is over-modulated and the modulating signal is distorted.

D. wrong: ma ≠1 includes under-modulation (ma < 1), which is not over-modulation.

Question 90 The frequency required to produce artificial

The frequency required to produce artificial gravity in a satellite is:

- A. 8.5 rev/min
- B. 9.5 rev/min ✓ **Correct answer**
- C. 9.8 rev/min
- D. 10.0 rev/min

A. wrong: the textbook value for the frequency that produces artificial gravity in a satellite is not 8.5 rev/min.

...e frequency required to produce artificial gravity in a satellite is 9.5 revolutions per minute, as stated in the textbook.

C. wrong: 9.8 is the value of g in m/s^2, not the frequency in rev/min.

D. wrong: the textbook value is 9.5 rev/min, not 10.0 rev/min.

Question 91 DISTITUTE DESTITUTE give the synonym

DISTITUTE / DESTITUTE (give the synonym):

- A. Disable
- B. Isolated
- C. Poor ✓ **Correct answer**
- D. Entangled

A. wrong: "disable" means to deprive of ability, not to be poor.

B. wrong: "isolated" means alone or separated, not poor.

C. correct: "destitute" means extremely poor, lacking the means to live.

D. wrong: "entangled" means involved in a complicated situation, not poor. Note: the stem prints "DISTITUTE / DESTITUTE" as in the source; "distitute" is a misspelling of "destitute".

Question 92 ORTHODOX give the antonym

ORTHODOX (give the antonym):

- A. Entangled
- B. Unconventional ✓ **Correct answer**
- C. Conventional
- D. Traditional

A. wrong: "entangled" is not the opposite of orthodox.

B. correct: "orthodox" means conventional and traditional, so its antonym is

C. wrong: "conventional" is a synonym of orthodox, not its antonym.

D. wrong: "traditional" is a synonym of orthodox, not its antonym.

Question 93 ECONOMICAL give the antonym

ECONOMICAL (give the antonym):

- A. Maddest
- B. Efficient
- C. Extravagant ✓ **Correct answer**
- D. Expensive

A. wrong: "maddest" is not the antonym of economical.

B. wrong: "efficient" is a synonym of economical (using resources without waste), not its antonym.

C. correct: "economical" means avoiding waste, and its antonym is "extravagant" (spending wastefully).

D. The printed key: wrong. "Expensive" is the antonym of "cheap", not of "economical"; an economical thing can still be expensive. (PRINTED-KEY ERROR CORRECTED: the printed key records D, "Expensive". That is wrong: the antonym of economical is extravagant ("Economical — Antonyms: Extravagant, wasteful, lavish, excessive"); "expensive" opposes "cheap". Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

Question 94 LIMITATIONS give the synonym

LIMITATIONS (give the synonym):

- A. Shortcomings
- B. Restriction ✓ **Correct answer**
- C. Vicinity

A. Also correct on the wording as printed: a shortcoming is a limitation, a fault or weakness that limits something.

B. Correct per the printed key: a restriction is a limitation placed on something.

C. wrong: "vicinity" means the nearby area, not a limitation.

D. wrong: "inability" means lack of ability, not a limitation in this sense. (PICK-ONE: "limitations" is synonymous with both "shortcomings" (A) and "restriction" (B); the printed key records B, which is filed. Decided by the assistant under the owner's 8 Nov 2026 delegation.)

Question 95 EXPEDIENT give the synonym

EXPEDIENT (give the synonym):

- A. Scapegoat
- B. Heterogeneous
- C. Suitable ✓ **Correct answer**
- D. Apathetic

A. wrong: a scapegoat is a person blamed for others' faults, not something expedient.

B. The printed key: wrong. "Heterogeneous" means varied or diverse, which has nothing to do with "expedient".

C. correct: "expedient" means convenient and suitable for a purpose.

D. wrong: "apathetic" means indifferent, not expedient. (PRINTED-KEY ERROR CORRECTED: the printed key records B, "Heterogeneous". That is wrong: the synonym of expedient is suitable (convenient, advantageous); heterogeneous is unrelated. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

96 VORACIOUS give the synonym

VORACIOUS (give the synonym):

- A. Reject
- B. Excitable
- C. Honest
- D. Greedy ✓ **Correct answer**

A. wrong: "reject" means to refuse, not to be greedy for food.

B. wrong: "excitable" means easily excited, not greedy.

C. wrong: "honest" is unrelated to voracious.

D. correct: "voracious" means greedily devouring, eager for food or for anything in excess.

Question 97 HAMPER give the antonym

HAMPER (give the antonym):

- A. Ogle
- B. Clarify
- C. Assist ✓ **Correct answer**
- D. Uncover

A. wrong: "ogle" means to stare at, not the opposite of hamper.

B. wrong: "clarify" means to make clear, not the opposite of hamper.

C. correct: "hamper" means to hinder or obstruct, so its antonym is "assist" (to help).

D. wrong: "uncover" means to reveal, not the opposite of hamper.

Question 98 MONOTONOUS give the synonym

MONOTONOUS (give the synonym):

- B. Conclusive
- C. Extremist
- D. Repetitive ✓ **Correct answer**

A. wrong: "limited" means restricted in extent, not the same as monotonous.

B. wrong: "conclusive" means decisive, not monotonous.

C. wrong: "extremist" means holding extreme views, not monotonous.

D. correct: "monotonous" means dull and repetitive, lacking variety.

Question 99 INTENSIVE give the antonym

INTENSIVE (give the antonym):

- A. Casual ✓ **Correct answer**
- B. Regressive
- C. Progressive
- D. Attentive

A. correct: "intensive" means thorough and concentrated, so its antonym is "casual" (relaxed, not thorough).

B. wrong: "regressive" means going backwards, not the opposite of intensive.

C. wrong: "progressive" means advancing, not the opposite of intensive.

D. wrong: "attentive" means paying attention, which is closer to intensive than to its opposite.

Question 100 PRECISE give the synonym

PRECISE (give the synonym):

- A. Concise ✓ **Correct answer**

- C. Exaggerate
- D. Explanatory

A. correct: among the options offered, "concise" (brief and to the point, exact in expression) is the intended synonym of "precise".

B. wrong: comprehensive means including everything, which is not the meaning of precise.

C. The printed key: wrong. To exaggerate is to overstate, which is the opposite of being precise.

D. wrong: explanatory means serving to explain, which is not the meaning of precise. (PRINTED-KEY ERROR CORRECTED: the printed key records C, "Exaggerate". That is wrong: exaggerate means to overstate beyond accuracy, the opposite of precise, whose proper synonyms are exact and accurate; among the options offered, "Concise" is the intended synonym in the MCQ-bank tradition (exact, economical expression), as in the vocabulary lists that group concise and precise together as antonyms of verbose. Corrected by the assistant under the owner's 8 Nov 2026 delegation.)

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