MDCAT (UHS entry test) — 2012 · Solved Past Paper

Body: University of Health Sciences, Lahore (UHS) · **Post:** MDCAT (UHS entry test) · **Year:** 2012 · **Questions:** 220 in the original paper — **218 solved and verified**, 2 excluded as defective (Q63, Q148) · **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 2012 sitting.

Source note: mdcatguide.com compilation 'UHS MDCAT 2012' (27 pages, scanned, no text layer), Paper Code B (Blue), 220 MCQs, 150 minutes, 1100 marks (5 per correct, -1 per wrong), held Sunday 23 September 2012. Sections in the paper's order: Physics 44, Chemistry 58, English 30, Biology 88. The official UHS answer key is NOT in this compilation (last pages are mdcatguide ads/book pages, PDF pp. 21-27). Verification: official UHS key as reproduced in the ARK book 'MDCAT Past Papers 2008-2016' (mcats-2008-2016.pdf, 180 pp), key table for Entrance Test 2012, Paper Code B, 220 rows, layout-parsed with the ID row skipped (verified against the scanned official key uhs2012-key.pdf); textbook fact and worked derivations for every answer; no Learnospot/PLS quiz exists for 2012. 5 answers correct the official key (Q3 field order Y>X>Z, Q36, Q44, Q97 tertiary alcohol, Q147 gastrin from pyloric stomach); 2 questions DEFECTIVE-excluded (Q63 correct value 6.02x10^23 not among the options, Q148 beta-cells of liver — no such cells; key X). Q213 prints the C option's label as (B); options filed in positional order. All 220 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 Physics

The diagram shows a small magnet hanging on a thread near the end of a solenoid carrying a steady current 'I': [Diagram: a solenoid with an iron core being inserted from the left; a bar magnet hangs to the right of the solenoid with N on the left and S on the right] What happens to the magnet as the iron core is inserted into the solenoid?

- A. It moves towards solenoid and rotates through 180°
- B. It moves towards the solenoid ✓ **Correct answer**
- C. It moves away from solenoid
- D. It moves away from solenoid and rotates through 180°

A. The magnet moves towards the solenoid, but it does not rotate through 180°.

B. The current makes the right-hand end of the solenoid a south pole, which attracts the north pole of the hanging magnet; inserting the iron core strengthens the field, so the magnet moves towards the solenoid.

C. The solenoid's right-hand end is a south pole, so it attracts (not repels) the magnet's north pole.

D. The magnet moves towards the solenoid, not away from it.

Question 2 Physics

A 10 cm long solenoid has 100 turns. What will be the magnetic field inside it along its axis if one micro ampere current is passed through it?

- A. $4\pi \times 10^{-13}$ tesla
- B. $4\pi \times 10^{-7}$ tesla
- C. $4\pi \times 10^{-10}$ tesla ✓ **Correct answer**
- D. $4\pi \times 10^{-16}$ tesla

A. $B = \mu_0(N/l)I = (4\pi\times10^{-7})(100/0.1)(10^{-6}) = 4\pi\times10^{-10}$ T, not $4\pi\times10^{-13}$ T.

B. $B = 4\pi\times10^{-10}$ T, not $4\pi\times10^{-7}$ T.

$(4\pi\times10^{-7})(1000)(10^{-3}) = 4\pi\times10^{-10}$ T.

D. B = $4\pi\times10^{-10}$ T, not $4\pi\times10^{-16}$ T.

Question 3 Physics

Two long straight parallel wires held vertically have equal but opposite currents as shown in the figure. [Diagram: left wire current up, right wire current down; point X to the left of the left wire, point Y between the wires, point Z to the right of the right wire] Which of the following effect will be observed?

- A. Magnetic field at 'X' is stronger than that at 'Y' and 'Z'
- B. Magnetic field at 'X' is weaker than that at 'Y' and 'Z'
- C. Magnetic field at 'X', 'Y' and 'Z' is same
- D. Magnetic field at 'X' is weaker than that at 'Y' but stronger than that at 'Z'. ✓ **Correct answer**

A. Between the wires (Y) the fields of the two wires point the same way (into the page) and add, so Y is the strongest; the official key gives A, which is wrong.

B. X is weaker than Y, but X is stronger than Z (X is closer to its wire than Z is to its wire: 115 px vs 150 px in the diagram), so X is not weaker than Z.

C. The fields differ (Y is strongest, Z weakest).

D. At Y the two fields add (both into the page), giving the strongest field; at X and Z the fields oppose, and X is closer to its wire (115 px) than Z is to its wire (150 px), so X > Z. The order is Y > X > Z.

Question 4 Physics

The kinetic energy K.E. with which the electron strikes the target is given by:

- A. K.E. = e^2V
- B. K.E. = hc/λ

- D. K.E. = eV ✓ **Correct answer**

A. The kinetic energy gained by an electron accelerated through potential V is eV, not e^2V.

B. hc/λ is the energy of a photon, not the kinetic energy of the electron.

C. hf^2 is not the kinetic energy of the electron.

D. An electron accelerated through a potential difference V gains kinetic energy eV.

Question 5 Physics

LASER is an acronym for:

- A. Light amplification by stimulated emission of radiation ✓ **Correct answer**
- B. Light annihilation by stimulated emission of radiation
- C. Light amplitude of stimulated emission of radiation
- D. Light amplification by stimulated emission of radio

A. LASER stands for Light Amplification by Stimulated Emission of Radiation.

B. LASER stands for Light Amplification, not Light Annihilation.

C. LASER stands for Light Amplification, not Light Amplitude.

D. LASER stands for Light Amplification by Stimulated Emission of Radiation, not Radio.

Question 6 Physics

X-rays can be produced by bombardment of _____ on target metal:

- A. Protons
- B. Electrons ✓ **Correct answer**
- C. Neutrons
- D. Alpha particles

produced by bombarding a target metal with electrons, not protons.

B. Fast-moving electrons striking a target metal produce X-rays.

C. X-rays are produced by electron bombardment, not neutrons.

D. X-rays are produced by electron bombardment, not alpha particles.

Question 7 Physics

Laser light is monochromatic which means

- A. It consists of one ray of light
- B. It consists of one wavelength ✓ **Correct answer**
- C. It consists of carbon monoxide gas
- D. It consists of photons having 1 eV energy

A. Monochromatic means of one wavelength, not one ray.

B. Monochromatic light consists of a single wavelength (one colour).

C. Monochromatic has nothing to do with carbon monoxide.

D. Monochromatic means one wavelength, not photons of 1 eV.

Question 8 Physics

If an electron in the 'K' shell is removed and an electron from 'L' shell jumps to occupy the hole in the 'K' shell, it emits a photon of energy:

- A. $hf_{K\alpha} = E_L - E_K$ ✓ **Correct answer**
- B. $hc = E_L - E_K$
- C. $h/\lambda_{K\alpha} = E_L - E_K$
- D. $hf_{K\alpha} = E_K - E_L$

A. The Kα photon energy is the difference between the L-shell and K-shell energies: $hf = E_L - E_K$.

ts of energy × length, so "hc = E_L − E_K" is dimensionally wrong.

C. h/λ has units of momentum, not energy (the correct form is hc/λ = E_L − E_K).

D. E_K − E_L is negative (the K shell is lower in energy), so this gives a negative photon energy.

Question 9 Physics

Which of the following property must be there in a substance so that it can be used as target in X-ray tube?

- A. It must have low melting point
- B. It must have low atomic number
- C. It must have high reflecting ability
- D. It must have high atomic number ✓ **Correct answer**

A. The target must have a high melting point (to withstand the heat), not a low one.

B. The target must have a high atomic number (for efficient X-ray production), not a low one.

C. The target needs a high atomic number and high melting point, not reflecting ability.

D. An X-ray tube target (e.g. tungsten) must have a high atomic number (and a high melting point) for efficient X-ray production.

Question 10 Physics

Which of the following can be used to produce population inversion for the emission of Laser?

- A. Optical pumping ✓ **Correct answer**
- B. Optical fibre
- C. Optical instrument
- D. Optical polarization

n inversion (more atoms in the excited state than the ground state) is produced by optical pumping.

B. An optical fibre guides light; it does not produce population inversion.

C. An optical instrument does not produce population inversion.

D. Optical polarization does not produce population inversion.

Question 11 Physics

What is the charge on alpha particles emitted during the phenomenon of radioactivity?

- A. +e
- B. −e
- C. −2e
- D. +2e ✓ **Correct answer**

A. An alpha particle (He^{2+}) carries charge +2e, not +e.

B. An alpha particle carries charge +2e, not −e.

C. An alpha particle carries charge +2e, not −2e.

D. An alpha particle is a helium nucleus (2 protons), so its charge is +2e.

Question 12 Physics

A radioactive nuclide decays by emitting an alpha particle, a beta particle and a gamma ray photon, the change in the nucleon number will be:

- A. -4 ✓ **Correct answer**
- B. -1
- C. -2
- D. -3

A. An α particle reduces the nucleon (mass) number by 4, β and γ emission do not change

al change is −4.

B. The α emission alone reduces the nucleon number by 4, not 1.

C. The α emission reduces the nucleon number by 4, not 2.

D. The α emission reduces the nucleon number by 4, not 3.

Question 13 Physics

A half-life of sodium-24 is _____ which is used to estimate the volume of blood in a patient:

- A. 6 hours
- B. 15 hours ✓ **Correct answer**
- C. 8 hours
- D. 15 days

A. The half-life of sodium-24 is 15 hours, not 6 hours.

B. Sodium-24 has a half-life of 15 hours and is used to estimate blood volume.

C. The half-life of sodium-24 is 15 hours, not 8 hours.

D. The half-life of sodium-24 is 15 hours, not 15 days.

Question 14 Physics

Which of the following is unit of absorbed dose?

- A. Sievert
- B. Gray ✓ **Correct answer**
- C. Roentgen
- D. Curie

A. The sievert is the unit of dose equivalent (effective dose), not absorbed dose.

Gy = J/kg) is the unit of absorbed dose.

C. The roentgen is the unit of exposure, not absorbed dose.

D. The curie is the unit of radioactivity (activity), not absorbed dose.

Question 15 Physics

In a radioactive phenomenon observation shown in figure where α deviates lesser than β in some electric or magnetic field (not shown in figure). What is the reason of less deviation of α? [Diagram: α, β and γ paths; α deviates least, β most, γ undeflected]

- A. α is charged particle
- B. α is neutral particle
- C. α is heavier particle ✓ **Correct answer**
- D. α is lighter particle

A. The α particle is charged, but that is not why it deviates less (the β particle is also charged).

B. The α particle is charged (+2e), not neutral. (The paper misprints this option's label as "C)" — it is the bottom-left, positionally B, option.)

C. The α particle is much heavier than the β particle (about 7300 times), so it is deflected less by the same field.

D. The α particle is heavier than the β particle, not lighter.

Question 16 Physics

The isotope of Iodine-131 is used in the treatment of

- A. Blood cancer
- B. Bone cancer
- C. Lung tumor
- D. Thyroid cancer ✓ **Correct answer**

I is used for thyroid cancer, not blood cancer.

B. Iodine-131 is used for thyroid cancer, not bone cancer.

C. Iodine-131 is used for thyroid cancer, not lung tumor.

D. Iodine-131 concentrates in the thyroid and is used to treat thyroid cancer.

Question 17 Physics

Which of the following effect is observed due to emission of β^- during the phenomenon of radioactivity?

- A. A increases by 1 and Z remains same
- B. Z increases by 1 and A remains same ✓ **Correct answer**
- C. Z decreases by 1 and A remains same
- D. A decreases by 1 and Z remains same

A. In β^- decay a neutron changes into a proton, so Z increases by 1 and A stays the same.

B. In β^- decay ($n \rightarrow p + e^-$), the atomic number Z increases by 1 and the mass number A is unchanged.

C. Z increases (not decreases) in β^- decay.

D. A is unchanged in β^- decay.

Question 18 Physics

Electric charge on an object is measured as 5 micro coulombs. How the value of this charge can be expressed in terms of base units:

- A. 5 x 100 ampere second
- B. 5 x 10^{-6} ampere second ✓ **Correct answer**
- C. 5 x 10^{+6} coulomb second
- D. 5 x 100 coulomb second

0 μC = 5×10⁻⁶ A·s, not 5×100 A·s.

B. 5 microcoulombs = 5×10^{-6} coulombs, and 1 coulomb = 1 ampere·second, so 5 μC = 5×10^{-6} A·s.

C. 5 μC = 5×10^{-6} C, not 5×10^{6} C·s.

D. 5 μC = 5×10^{-6} A·s, not 5×100 C·s.

Question 19 Physics

If 'm' is the mass, 'c' is the velocity of light and $x = mc^2$, then dimensions of 'x' will be:

- A. $[LT^{-1}]$
- B. $[ML^2T^{-2}]$ ✓ **Correct answer**
- C. $[MLT^{-1}]$
- D. $[MLT^{-2}]$

A. $x = mc^2$ has the dimensions of energy $[ML^2T^{-2}]$, not $[LT^{-1}]$.

B. [m] = [M] and $[c^2] = [L^2T^{-2}]$, so $[mc^2] = [ML^2T^{-2}]$ (energy).

C. $[mc^2] = [ML^2T^{-2}]$, not $[MLT^{-1}]$.

D. $[MLT^{-2}]$ is the dimension of force, not of mc^2 (energy).

Question 20 Physics

A force 'F' is acting at point 'P' of a uniform rod capable to rotate about 'O'. What is the torque about 'O'? [Diagram: rod OP horizontal, O at left, P at right; force F applied at P at angle θ from the vertical dashed line]

- A. (OP)(F tanθ)
- B. (OP)(F)
- C. (OP)(F sinθ)
- D. (OP)(F cosθ) ✓ **Correct answer**

e is (OP)(F cosθ), not (OP)(F tanθ).

B. The torque is (OP)(F cosθ), not (OP)(F).

C. The force makes angle θ with the vertical, so its component perpendicular to the rod is F cosθ (not F sinθ).

D. The component of F perpendicular to the rod is F cosθ (θ measured from the vertical), so the torque about O is (OP)(F cosθ).

Question 21 Physics

An object of mass 'm' is suspended in an elevator moving downward with acceleration equal to acceleration due to gravity. What is the apparent weight of object?

- A. Zero ✓ **Correct answer**
- B. 2mg
- C. mg
- D. mg/2

A. Apparent weight = m(g − a) = m(g − g) = 0 (weightlessness in free fall).

B. The apparent weight is 0, not 2mg.

C. The apparent weight is 0, not mg.

D. The apparent weight is 0, not mg/2.

Question 22 Physics

Stokes' Law for steady motion in a fluid of infinite extent is given by

- A. $F = 6\pi\eta rv$ ✓ **Correct answer**
- B. $F = (4/3)\pi r^3\rho g$
- C. $F = 6\pi\eta r^2\rho$
- D. $F = 2gr^2\rho/9\eta$

w: the drag force on a sphere moving steadily in a viscous fluid is F = 6πηrv.

B. That is the weight of a sphere (volume × density × g), not Stokes' law.

C. Stokes' law is F = 6πηrv, not $6\pi\eta r^2\rho$.

D. That is related to the terminal velocity formula, not Stokes' law.

Question 23 Physics

If speed of efflux through a small hole in a large tank is 9.8 m/s. Find the height at the fluid above the hole

- A. 1 m
- B. 9.8 m
- C. 4.9 m ✓ **Correct answer**
- D. 19.6 m

A. By Torricelli's theorem, $h = v^2/2g = 9.8^2/(2\times9.8) = 4.9$ m, not 1 m.

B. $h = v^2/2g = 4.9$ m, not 9.8 m.

C. Torricelli's theorem: $v = \sqrt{(2gh)}$, so $h = v^2/2g = (9.8)^2/(2\times9.8) = 4.9$ m.

D. $h = v^2/2g = 4.9$ m, not 19.6 m.

Question 24 Physics

Flow speed of the fluid through a non-uniform pipe increases from 1 m/sec to 3 m/sec. If change in P.E. is zero, then pressure difference between two points will be: (density of the fluid = 1000 kg/m^3)

- A. 1000 N/m^2
- B. 9000 N/m^2
- C. 8000 N/m^2
- D. 4000 N/m^2 ✓ **Correct answer**

$^2 - v_1^2) = \frac{1}{2}(1000)(9 - 1) = 4000$ N/m², not 1000 N/m².

B. $\Delta P = 4000$ N/m², not 9000 N/m².

C. $\Delta P = \frac{1}{2}(1000)(9 - 1) = 4000$ N/m², not 8000 N/m².

D. By Bernoulli's equation (no change in potential energy), $\Delta P = \frac{1}{2}\rho(v_2^2 - v_1^2) = \frac{1}{2} \times 1000 \times (3^2 - 1^2) = 4000$ N/m².

Question 25 Physics

Polarization of light exhibited the nature of light as

- A. Longitudinal wave
- B. Compressional wave
- C. Transverse wave ✓ **Correct answer**
- D. Electromagnetic wave

A. Polarization is possible only for transverse waves, not longitudinal waves.

B. A compressional (longitudinal) wave cannot be polarized.

C. Polarization shows that light is a transverse wave (only transverse waves can be polarized).

D. Polarization shows light is transverse; "electromagnetic wave" is not what polarization specifically demonstrates.

Question 26 Physics

The concentration of a sugar solution can be determined by

- A. Un-polarized light
- B. Plane polarized light ✓ **Correct answer**
- C. Interference of light
- D. Diffraction of light

ntration is measured with plane-polarized light (polarimeter), not un-polarized light.

B. A sugar solution rotates the plane of plane-polarized light (optical activity); the angle of rotation gives the concentration (polarimetry).

C. Interference does not measure sugar concentration.

D. Diffraction does not measure sugar concentration.

Question 27 Physics

The information from one place to another can be transmitted very safely and easily by:

- A. Copper wire
- B. Aluminium wire
- C. Photodiode
- D. Optical fibre ✓ **Correct answer**

A. Information is transmitted most safely and easily by optical fibre (no interference, high bandwidth), not copper wire.

B. Information is transmitted most safely and easily by optical fibre, not aluminium wire.

C. A photodiode detects light; it does not transmit information.

D. Optical fibre transmits information safely (immune to electromagnetic interference) and easily (high bandwidth).

Question 28 Physics

The image of an object placed inside the focal length of a convex lens will be largest and clearest when it is at the

- A. Less than 25 cm
- B. Near point ✓ **Correct answer**

ater than 25 cm

- D. Infinity

A. The image is largest and clearest when it is at the near point (25 cm), not less than 25 cm.

B. When a convex lens is used as a magnifier, the image is largest and clearest when it is formed at the near point (25 cm from the eye).

C. The image is largest and clearest at the near point, not beyond it.

D. The image at infinity is large but not the clearest for the eye (it requires the eye to be relaxed, and the magnification is less).

Question 29 Physics

A simple harmonic oscillator has a time period of 10 seconds. Which equation rotates its acceleration 'a' and displacement 'x'?

- A. a = -2 x
- B. a = -(20π)x
- C. a = -((2π)/10)² x ✓ **Correct answer**
- D. a = -(20π)²x

A. $a = -\omega^2 x$ with $\omega = 2\pi/T = 2\pi/10$, so $a = -(2\pi/10)^2 x$, not $-2x$.

B. $a = -\omega^2 x = -(2\pi/10)^2 x$, not $-(20\pi)x$.

C. For SHM, $a = -\omega^2 x$ and $\omega = 2\pi/T = 2\pi/10$, so $a = -(2\pi/10)^2 x$.

D. $a = -(2\pi/10)^2 x$, not $-(20\pi)^2 x$.

Question 30 Physics

When the length of a simple pendulum is doubled, find the ratio of the new frequency to the old frequency?

- B. 1/2
- C. √2
- D. 1/√2 ✓ **Correct answer**

A. f ∝ 1/√l, so doubling l gives f_new/f_old = 1/√2, not 1/4.

B. f_new/f_old = 1/√2, not 1/2.

C. The frequency decreases (not increases) when the length is doubled.

D. The frequency of a simple pendulum is f = (1/2π)√(g/l), so f ∝ 1/√l; doubling l gives f_new/f_old = √(l_old/l_new) = 1/√2.

Question 31 Physics

In the diagram below, the displacement of an oscillating particle is plotted against time. What does the length 'PR' on the time axis represents? [Diagram: displacement-time sine wave; P is at the end of the first complete vibration (one period), R is half a period later]

- A. Twice the frequency
- B. Half the period ✓ **Correct answer**
- C. Half the frequency
- D. Twice the period

A. PR is a length on the time axis (a time), not a frequency.

B. P is at the end of one complete vibration (t = T) and R is half a period later (t = 3T/2), so PR = T/2 (half the period).

C. PR is a time interval, not a frequency.

D. PR = T/2 (half the period), not 2T.

32 Physics

When the source of sound moves towards the stationary observer, the value of apparent frequency 'f_o' is:

- A. $f_o = ((v+u_l)/v)\ f$
- B. $f_o = (v/(v-u_l))\ f$ ✓ **Correct answer**
- C. $f_o = (v/(v+u_l))\ f$
- D. $f_o = ((v-u_l)/v)\ f$

A. For a source moving towards a stationary observer, $f_o = (v/(v - u_s))f$, not $((v + u)/v)f$.

B. By the Doppler effect, a source moving towards a stationary observer gives $f_o = (v/(v - u_s))f$ (higher frequency).

C. That is the formula for a source moving away from the observer.

D. That is the formula for an observer moving away from a stationary source.

Question 33 Physics

The ratio of tensile strength to tensile strain is called

- A. Modulus of elasticity
- B. Bulk Modulus
- C. Young's Modulus ✓ **Correct answer**
- D. Shear Modulus

A. Young's modulus is the specific modulus for tensile stress/strain (the general term is modulus of elasticity).

B. The bulk modulus is the ratio of volume stress to volume strain, not tensile stress to tensile strain.

C. Young's modulus = tensile stress / tensile strain.

D. The shear modulus is the ratio of shear stress to shear strain, not tensile stress to

Question 34 Physics

A wire is stretched by a force 'F' which causes an extension Δl, the energy stored in the wire is:

- A. FΔl
- B. 2FΔl
- C. ½ FΔl²
- D. ½ FΔl ✓ **Correct answer**

A. The elastic potential energy stored is ½FΔl (the area under the force-extension graph), not FΔl.

B. The energy stored is ½FΔl, not 2FΔl.

C. The energy stored is ½FΔl, not ½FΔl².

D. The work done in stretching the wire (energy stored) is the area of the force-extension triangle = ½ × F × Δl.

Question 35 Physics

H_2 and O_2 both are at thermal equilibrium at temperature 300 K. Oxygen molecule is 16 times massive than hydrogen. Root mean square speed of hydrogen is

- A. 4 root mean square of oxygen ✓ **Correct answer**
- B. ¼ root mean square of oxygen
- C. 1/16 root mean square of oxygen
- D. 1/6 root mean square of oxygen

A. v_rms = √(3RT/M), so v_H/v_O = √(M_O/M_H) = √16 = 4; the rms speed of hydrogen is 4 times that of oxygen.

B. The rms speed of hydrogen is 4 times (not ¼) that of oxygen.

√16 = 4, not 1/16.

D. v_H/v_O = 4, not 1/6.

Question 36 Physics

Which of the following is expression of mean square speed of 'N' gas molecules contained in a cylinder?

- A. $(v_1+v_2+...+v_x)/N$
- B. $(v_1^2+v_2^2+...+v_x^2)/N$ ✓ **Correct answer**
- C. $\sqrt{[(v_1+v_2+...+v_x)/N]}$
- D. $\sqrt{[(v_1^2+v_2^2+...+v_x^2)/N]}$

A. That is the mean speed, not the mean square speed; the official key gives A, which is wrong.

B. The mean square speed is the mean of the squared speeds: $\langle v^2 \rangle = (v_1^2 + v_2^2 + ... + v_N^2)/N$.

C. That is the square root of the mean speed, not the mean square speed.

D. That is the root mean square speed, not the mean square speed.

Question 37 Physics

If 'Q' is the amount of heat supplied to a system and 'W' is the work done, then change in internal energy can be defined as

- A. Q/W
- B. Q − W ✓ **Correct answer**
- C. W/Q
- D. 1 + Q/W

A. The change in internal energy is ΔU = Q − W, not Q/W.

t law of thermodynamics, $\Delta U = Q - W$ (heat supplied minus work done by the system).

C. $\Delta U = Q - W$, not W/Q.

D. $\Delta U = Q - W$, not 1 + Q/W.

Question 38 Physics

A heat engine operating according to second law of thermodynamics rejects one fourth of the heat taken from high temperature reservoir. What is the percentage efficiency of heat engine?

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

A. The efficiency is $1 - Q_2/Q_1 = 1 - 1/4 = 75\%$, not 100%.

B. 25% is the fraction rejected, not the efficiency.

C. The efficiency is 75%, not 50%.

D. Efficiency = $(Q_1 - Q_2)/Q_1 = 1 - 1/4 = 3/4 = 75\%$.

Question 39 Physics

First law of thermodynamics under adiabatic conditions can be mathematically written as:

- A. Q = W
- B. Q = ΔU
- C. Q = U + W
- D. W = − ΔU ✓ **Correct answer**

abatic conditions Q = 0, so ΔU = −W (i.e. W = −ΔU), not Q = W.

B. Under adiabatic conditions Q = 0 and ΔU = −W, not Q = ΔU.

C. The first law is ΔU = Q − W; under adiabatic conditions (Q = 0) this gives W = −ΔU.

D. Under adiabatic conditions Q = 0, so ΔU = Q − W = −W, i.e. W = −ΔU.

Question 40 Physics

What is the logic symbol for a NOT Gate?

- A. Symbol: triangle with a small circle at the output (NOT gate) ✓ **Correct answer**
- B. Symbol: D-shaped AND gate
- C. Symbol: OR gate
- D. Symbol: diode

A. The NOT gate symbol is a triangle (buffer) with a small circle (inversion bubble) at the output.

B. The D-shaped symbol is the AND gate, not the NOT gate.

C. The curved-input symbol is the OR gate, not the NOT gate.

D. The triangle-with-bar symbol is a diode, not the NOT gate.

Question 41 Physics

The voltage that is applied across X-plates is provided by a circuit called

- A. Audio generator
- B. Time base generator ✓ **Correct answer**
- C. Signal generator
- D. Linear generator

A. The X-plates of a CRO are driven by the time base generator, not an audio generator.

base generator provides the sawtooth voltage applied across the X-plates (to sweep the spot horizontally).

C. The signal generator is not what drives the X-plates.

D. The X-plates are driven by the time base generator, not a linear generator.

Question 42 Physics

What will be the effect on the capacitance of a capacitor if area of each plate is doubled while separation between the plates is halved?

- A. Capacitance remains same
- B. Capacitance becomes double
- C. Capacitance becomes four times ✓ **Correct answer**
- D. Capacitance reduces to half

A. C = $\varepsilon_0 A/d$; doubling A and halving d gives C → 4C, not the same.

B. C becomes four times, not double.

C. C = $\varepsilon_0 A/d$; A → 2A and d → d/2 gives C → $\varepsilon_0(2A)/(d/2) = 4C$.

D. The capacitance increases fourfold, it does not reduce.

Question 43 Physics

10 V potential difference is applied across the plate of 1 μF capacitor. What is the energy storied in capacitor?

- A. 0.5 mJ
- B. 0.05 mJ ✓ **Correct answer**
- C. 5 mJ
- D. 50 mJ

A. $U = \frac{1}{2}CV^2 = \frac{1}{2}(1\times10^{-6})(10^2) = 50\times10^{-6}$ J = 0.05 mJ, not 0.5 mJ.

= ½ × 1×10⁻⁶ × 100 = 5×10⁻⁶ J = 0.05 mJ.

C. U = 0.05 mJ, not 5 mJ.

D. U = 0.05 mJ, not 50 mJ.

Question 44 Physics

Which one of the following is I-V curve of a junction diode? [Graphs: A) S-shaped curve, ~zero current for negative V, rising and bending over for positive V; B) straight line through the origin; C) straight line in the first quadrant only; D) line in the second and fourth quadrants]

- A. Graph: S-shaped curve, ~zero current for negative V, rising for positive V ✓ **Correct answer**
- B. Graph: straight line through the origin
- C. Graph: straight line in the first quadrant only
- D. Graph: line in the second and fourth quadrants

A. A junction diode has ~zero current in reverse bias and a nonlinear (exponentially rising) current in forward bias — the only nonlinear curve of the four.

B. A straight line through the origin is an ohmic resistor (V = IR), not a diode; the official key gives B, which is wrong.

C. A straight line is ohmic (linear), not the diode's nonlinear characteristic.

D. That is a negative-resistance characteristic, not a diode.

Question 45 Chemistry

In the below reaction the nucleophile which attacks on the carbon atom of acid is:

$CH_3COOH + PCl_5 \longrightarrow H_3C—C(=O)—Cl + POCl_3 + HCl$

- A. OH^-
- B. P

✓ Correct answer

- D. H^-

A. The hydroxyl group is the leaving group (it is replaced), not the nucleophile that attacks the carbon.

B. Phosphorus is not the nucleophile.

C. The chloride ion (from PCl_5) is the nucleophile that attacks the carbonyl carbon, replacing the —OH group.

D. The hydride ion is not the nucleophile in this reaction.

Question 46 Chemistry

When ethanol chloride reacts with methylamine, an amide is formed. What is the structure of the amide formed?

- A. Structure: $H_3C—CH_2—C(=O)—NH_2$
- B. Structure: $H_3C—CH_2—C(=O)—NHCH_3$
- C. Structure: $H_3C—C(=O)—NH_2$
- D. Structure: $H_3C—C(=O)—NHCH_3$ ✓ **Correct answer**

A. That is propanamide (from propanoyl chloride and ammonia), not the product of ethanoyl chloride and methylamine.

B. That is N-methylpropanamide, not the product of ethanoyl chloride and methylamine.

C. That is acetamide (from ethanoyl chloride and ammonia), not with methylamine.

D. Ethanoyl chloride (CH_3COCl) reacts with methylamine (CH_3NH_2) to give N-methylacetamide, $CH_3CONHCH_3$.

Question 47 Chemistry

Organic compound containing both amine and carboxyl group is known as

no acid ✓ **Correct answer**

- B. Fatty acid
- C. Saccharide
- D. Amide

A. An amino acid contains both an amino group (—NH_2) and a carboxyl group (—COOH).

B. A fatty acid contains a carboxyl group but no amino group.

C. A saccharide (sugar) contains hydroxyl and carbonyl groups, not an amino and a carboxyl group.

D. An amide contains a —CONH— group, not a separate amino and carboxyl group.

Question 48 Chemistry

Alanine is an amino acid which shows neutral effect on litmus paper, the formula of alanine may be

- A. Structure: H_2N—CH(H)—COOH with CH_3 side chain ✓ **Correct answer**
- B. Structure: H_2N—CH(H)—CH(NH_2)—COOH
- C. Structure: HOOC—CH_2—CH(NH_2)—COOH
- D. Structure: $H_2C(NH_2)$—$(CH_2)_3$—CH(NH_2)—COOH

A. Alanine is CH_3—CH(NH_2)—COOH (a neutral amino acid — one amino and one carboxyl group).

B. That is 2,3-diaminopropanoic acid (a basic/diamino acid, not alanine).

C. That is aspartic acid (an acidic amino acid, not alanine).

D. That is lysine (a basic/diamino acid, not alanine).

Question 49 Chemistry

Which of the following structures is not an alpha amino acid?

- B. Structure: $H_2N—CH_2—CH_2—CH_2—CH_2—COOH$ ✓ **Correct answer**
- C. Structure: $H_2N—CH(CH_2—phenyl)—COOH$
- D. Structure: $H_2N—CH(CH_2OH)—COOH$

A. That is alanine (the amino group is on the α-carbon) — an alpha amino acid.

B. That is 5-aminopentanoic acid (the amino group is on the terminal carbon, not the α-carbon) — not an alpha amino acid.

C. That is phenylalanine (the amino group is on the α-carbon) — an alpha amino acid.

D. That is serine (the amino group is on the α-carbon) — an alpha amino acid.

Question 50 Chemistry

The skeletal formula of dipeptide formed between aspartic acid and phenylalanine is given below: [Structure: $HOOC—CH_2—CH(NH_2)—C(=O)—NH—CH(CH_2—phenyl)—C(=O)—OCH_3$] How many functional groups are present in its formula?

- A. 1
- B. 2
- C. 4 ✓ **Correct answer**
- D. 3

A. There are 4 functional groups, not 1.

B. There are 4 functional groups, not 2.

C. The structure contains four functional groups: a carboxylic acid (—COOH), an amino group ($—NH_2$), a peptide/amide linkage (—CONH—) and an ester group ($—COOCH_3$).

D. There are 4 functional groups, not 3.

51 Chemistry

In basic conditions, amino acid exists in which of the following forms?

- A. $H_3N^+—CH_2—COOH$
- B. $H_2N—CH_2—COOH$
- C. $H_3N^+—CH_2—COO^-$
- D. $H_2N—CH_2—COO^-$ ✓ **Correct answer**

A. In basic conditions the amino acid is deprotonated (—NH_2 and —COO^-), not fully protonated.

B. In basic conditions the carboxyl group is deprotonated (—COO^-), not —COOH.

C. In basic conditions the amino group is deprotonated (—NH_2), not —NH_3^+.

D. In basic (alkaline) conditions the amino acid exists as the anion (—NH_2 and —COO^-).

Question 52 Chemistry

Structure of dipeptide is [$H_2N—CH_2—C(=O)—NH—CH(CH_3)—COOH$] This is called:

- A. Glycyl glycine
- B. Glycyl alanine ✓ **Correct answer**
- C. Alanyl alanine
- D. Alanyl glycine

A. The C-terminal residue is alanine (CH_3 side chain), not glycine.

B. The dipeptide is glycine (N-terminal) joined to alanine (C-terminal): glycyl alanine. (The paper misprints this option's label as "C)" — it is the bottom-left, positionally B, option.)

C. The N-terminal residue is glycine, not alanine.

D. The N-terminal residue is glycine and the C-terminal is alanine (glycyl alanine), not alanyl glycine.

53 Chemistry

The principle energy storage carbohydrate in animal's is

- A. Glucose
- B. Starch
- C. Protein
- D. Glycogen ✓ **Correct answer**

A. Glucose is the immediate fuel, not the principal storage carbohydrate in animals.

B. Starch is the storage carbohydrate in plants, not animals.

C. Protein is not a carbohydrate.

D. Glycogen is the principal energy-storage carbohydrate in animals.

Question 54 Chemistry

Starch is a polymer of

- A. β–D–glucose
- B. α– –glucose [α-D-glucose] ✓ **Correct answer**
- C. γ–D–glucose
- D. α–L–glucose

A. Starch is a polymer of α-D-glucose (cellulose is the β-D-glucose polymer).

B. Starch is a polymer of α-D-glucose (the paper prints "α– –glucose" with the D faint/missing).

C. Starch is a polymer of α-D-glucose, not γ-D-glucose.

D. Starch is a polymer of α-D-glucose, not α-L-glucose.

55 Chemistry

The reaction between fats and caustic soda is called

- A. Hydrogenolysis
- B. Fermentation
- C. Esterification
- D. Saponification ✓ **Correct answer**

A. Hydrogenolysis is cleavage by hydrogen, not the reaction of fats with caustic soda.

B. Fermentation is the anaerobic breakdown of sugars, not the reaction of fats with caustic soda.

C. Esterification forms an ester from an acid and an alcohol; fats + NaOH is saponification.

D. Fats (triglycerides) react with caustic soda (NaOH) to give soap and glycerol — saponification.

Question 56 Chemistry

Adipic acid and hexamethylene diamine both of which have _____ carbon atoms:

- A. Seven
- B. Eight
- C. Six ✓ **Correct answer**
- D. Four

A. Adipic acid (hexanedioic acid) and hexamethylene diamine each have six carbon atoms, not seven.

B. Each has six carbon atoms, not eight.

C. Adipic acid ($HOOC—(CH_2)_4—COOH$) has six carbons and hexamethylene diamine ($H_2N—(CH_2)_6—NH_2$) has six carbons.

D. Each has six carbon atoms, not four.

57 Chemistry

Lactose is a sugar present in milk. It is an example of

- A. Disaccharides ✓ **Correct answer**
- B. Monosaccharides
- C. Polysaccharides
- D. Starch

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

B. Lactose is a disaccharide, not a monosaccharide.

C. Lactose is a disaccharide, not a polysaccharide.

D. Lactose is a disaccharide, not starch.

Question 58 Chemistry

Macromolecules are described as large molecules built up from small repeating units called:

- A. Monomers ✓ **Correct answer**
- B. Isomers
- C. Metamers
- D. Tautomers

A. Macromolecules (polymers) are built from small repeating units called monomers.

B. Isomers are compounds with the same formula but different structures, not the repeating units of macromolecules.

C. Metamers are isomers differing in the distribution of carbon atoms, not the repeating units of macromolecules.

D. Tautomers are isomers that interconvert, not the repeating units of macromolecules.

59 Chemistry

The increase in concentration of oxidizing agents in smog like H_2O_2, HNO_3, PAN and ozone in the air is called

- A. Carbonated smog
- B. Nitrated smog
- C. Photochemical smog ✓ **Correct answer**
- D. Sulphonated smog

A. The increase in oxidising agents (H_2O_2, HNO_3, PAN, ozone) is photochemical smog, not carbonated smog.

B. The increase in oxidising agents is photochemical smog, not nitrated smog.

C. Photochemical smog contains oxidising agents (H_2O_2, HNO_3, PAN, ozone) formed by sunlight acting on pollutants.

D. The increase in oxidising agents is photochemical smog, not sulphonated smog.

Question 60 Chemistry

Which is the metal, whose elevated concentration is harmful for fish as it clogs the gills thus causing suffocation?

- A. Sodium
- B. Lead
- C. Zinc
- D. Aluminium ✓ **Correct answer**

A. Aluminium (not sodium) clogs fish gills and causes suffocation.

B. Lead is toxic to fish, but aluminium is the metal that clogs the gills.

C. Zinc is toxic at high levels, but aluminium is the metal that clogs the gills.

D. Elevated aluminium (Al^{3+}) precipitates on fish gills, clogging them and causing

Question 61 Chemistry

An organic compound has empirical formula C_3H_3O, if molar mass of compound is 110.15 $gmol^{-1}$. The molecular formula of this organic compound is (A_r of C=12, H=1.008 and O=16)

- A. $C_6H_6O_2$ ✓ **Correct answer**
- B. C_3H_3O
- C. $C_9H_9O_3$
- D. $C_6H_6O_3$

A. The empirical formula mass is 3(12) + 3(1.008) + 16 = 55.024; n = 110.15/55.024 ≈ 2, so the molecular formula is $(C_3H_3O)_2 = C_6H_6O_2$.

B. That is the empirical formula (n = 1), not the molecular formula (n = 2). (The paper misprints this option's label as "C)" — it is the bottom-left, positionally B, option.)

C. That would be n = 3 (molar mass ≈ 165), not n = 2.

D. That has three oxygen atoms; the molecular formula is $C_6H_6O_2$.

Question 62 Chemistry

When 8 grams (4 moles) of H_2 react with 2 moles of O_2, how many moles of water will be formed?

- A. Five
- B. Four ✓ **Correct answer**
- C. Six
- D. Three

A. 4 mol H_2 + 2 mol O_2 gives 4 mol H_2O, not 5.

B. $2H_2 + O_2 \rightarrow 2H_2O$; 4 mol H_2 reacts with 2 mol O_2 to give 4 mol H_2O.

D. 4 mol H_2 gives 4 mol H_2O, not 3.

Question 63 Chemistry

The number of molecules in 22.4 dm^3 of H_2 gas at 0 °C and 1 atm are

- A. 60.2×10^{23}
- B. 6.02×10^{22}
- C. 6.02×10^{25}
- D. 6.02×10^{22}

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). 22.4 dm^3 of H_2 at 0 °C and 1 atm is 1 mole, which contains 6.02×10^{23} molecules — but that value is not among the options (A is $60.2\times10^{23} = 6.02\times10^{24}$, B and D are both 6.02×10^{22}, C is 6.02×10^{25}). Options B and D are also identical to each other. The official key gives D, which is wrong by a factor of 10. This question must never be taught as having an answer.

A. $60.2\times10^{23} = 6.02\times10^{24}$ molecules, ten times too many (the correct value is 6.02×10^{23}).

B. That is ten times too few (the correct value is 6.02×10^{23}).

C. That is a hundred times too many.

D. That is ten times too few (and identical to option B); the official key gives D, which is wrong.

Question 64 Chemistry

Correct order of boiling points of the given liquid is

- A. $H_2O > HF > HCl > NH_3$
- B. $HF > H_2O > HCl > NH_3$
- C. $H_2O > HF > NH_3 > HCl$ ✓ **Correct answer**

> H_2O > NH_3 > HCl

A. NH_3 (−33 °C) boils higher than HCl (−85 °C), so the order is H_2O > HF > NH_3 > HCl.

B. H_2O (100 °C) boils higher than HF (19.5 °C).

C. Boiling points: H_2O 100 °C > HF 19.5 °C > NH_3 −33 °C > HCl −85 °C.

D. H_2O boils higher than HF.

Question 65 Chemistry

The relative energies of 4s, 4p and 3d orbitals are in the order

- A. 3d < 4p < 4s
- B. 4s < 3d < 4p ✓ **Correct answer**
- C. 4p < 4s < 3d
- D. 4p < 3d < 4s

A. The energies increase 4s < 3d < 4p, not 3d < 4p < 4s.

B. By the Aufbau principle the energies increase in the order 4s, then 3d, then 4p.

C. 4p has the highest energy of the three, not the lowest.

D. 4s has the lowest energy of the three, not the highest.

Question 66 Chemistry

With increase in the value of Principal Quantum Number 'n', the shape of the s-orbitals remains the same although their sizes

- A. Decrease
- B. Increase ✓ **Correct answer**
- C. Remain the same
- D. May or may not remain the same

of s-orbitals increase with n, they do not decrease.

B. s-orbitals remain spherical but their size (radius) increases as the principal quantum number n increases.

C. The shape remains the same but the size increases.

D. The size definitely increases with n.

Question 67 Chemistry

The angle between unhybridized p-orbital and three sp^2 hybrid orbitals of each carbon atom in ether is:

- A. 120°
- B. 90° ✓ **Correct answer**
- C. 109.5°
- D. 180°

A. 120° is the angle between the sp^2 hybrid orbitals themselves, not between the p-orbital and the sp^2 orbitals.

B. The unhybridized p-orbital is perpendicular to the plane of the three sp^2 hybrid orbitals, so the angle is 90°. (The stem prints "ether" — evidently a misprint for "ethene", whose carbons are sp^2 hybridized with an unhybridized p-orbital.)

C. 109.5° is the tetrahedral (sp^3) angle, not the p–sp^2 angle.

D. The p-orbital is perpendicular (90°) to the sp^2 plane, not 180°.

Question 68 Chemistry

In 'H-F' bond electronegativity difference is '1.9'. What is the type of this bond?

- A. Polar covalent bond ✓ **Correct answer**
- B. Non-polar covalent bond

- D. Co-ordinate covalent bond

A. An electronegativity difference of 1.9 gives a polar covalent bond (partial ionic character).

B. A non-polar covalent bond has an electronegativity difference near zero, not 1.9.

C. A pi bond is a type of covalent bond (sideways overlap), not determined by electronegativity difference.

D. A co-ordinate bond is formed by one atom donating both electrons; the H–F bond is a polar covalent bond.

Question 69 Chemistry

'ΔH' will be given a negative sign in

- A. Exothermic reactions ✓ **Correct answer**
- B. Decomposition reactions
- C. Dissociation reaction
- D. Endothermic reactions

A. In an exothermic reaction heat is released, so ΔH is negative.

B. Decomposition reactions are usually endothermic (ΔH positive).

C. Dissociation reactions are usually endothermic (ΔH positive).

D. In an endothermic reaction heat is absorbed, so ΔH is positive.

Question 70 Chemistry

Lattice energy of an ionic crystal is the enthalpy of

- A. Combustion
- B. Dissociation

- D. Formation ✓ **Correct answer**

A. Lattice energy is not the enthalpy of combustion.

B. Lattice energy is defined (in the textbook) as the enthalpy of formation of the crystal from gaseous ions; the dissociation energy is equal in magnitude but opposite in sign.

C. Lattice energy is not the enthalpy of dissolution.

D. Lattice energy is the enthalpy change when one mole of an ionic crystal is formed from its gaseous ions.

Question 71 Chemistry

As number of solute particles increases, freezing point of the solution:

- A. Remains the same
- B. Increases
- C. First increases, then decreases
- D. Decreases ✓ **Correct answer**

A. The freezing point decreases (freezing point depression) as solute particles increase.

B. The freezing point decreases, it does not increase.

C. The freezing point decreases monotonically with solute concentration.

D. Adding solute lowers the freezing point (freezing point depression, a colligative property).

Question 72 Chemistry

Boiling point constants help us to determine

- A. Molar masses ✓ **Correct answer**
- B. Volumes

- D. Masses

A. The ebullioscopic constant (Kb) is used to determine the molar mass of a solute (from the boiling point elevation).

B. Boiling point constants do not determine volumes.

C. Boiling point constants do not determine pressures.

D. Boiling point constants determine molar masses, not masses.

Question 73 Chemistry

In electrolysis of aqueous $CuCl_2$, the metal deposited at cathode is

- A. Sodium
- B. Aluminium
- C. Lead
- D. Copper ✓ **Correct answer**

A. Sodium is not present in aqueous $CuCl_2$.

B. Aluminium is not present in aqueous $CuCl_2$.

C. Lead is not present in aqueous $CuCl_2$.

D. In the electrolysis of aqueous $CuCl_2$, Cu^{2+} ions are reduced at the cathode and copper metal is deposited.

Question 74 Chemistry

In $MgCl_2$, the oxidation state of 'Cl' is

- A. Zero
- B. +2
- C. -2

Correct answer

A. In $MgCl_2$, chlorine is −1, not zero.

B. In $MgCl_2$, magnesium is +2 and chlorine is −1.

C. Chlorine is −1 in $MgCl_2$, not −2.

D. Mg is +2, so each Cl is −1 (2 × (−1) + 2 = 0).

Question 75 Chemistry

Formation of NH_3 is reversible and exothermic process, what will happen on cooling?

- A. More reactant will form
- B. More N_2 will be formed
- C. More H_2 will be formed
- D. More product (NH_3) will be formed ✓ **Correct answer**

A. Cooling an exothermic reaction favours the forward reaction (more product), not more reactant.

B. Cooling favours NH_3 formation, not N_2.

C. Cooling favours NH_3 formation, not H_2.

D. By Le Chatelier's principle, cooling an exothermic reaction shifts the equilibrium towards the products (more NH_3).

Question 76 Chemistry

A buffer solution is that which resists/minimizes the change in

- A. pOH
- B. pH ✓ **Correct answer**
- C. pKa
- D. pKb

esists change in pH (and hence pOH), but the defining quantity is pH.

B. A buffer solution resists (minimizes) changes in pH when small amounts of acid or base are added.

C. pKa is a constant of the acid, not what a buffer resists changing.

D. pKb is a constant of the base, not what a buffer resists changing.

Question 77 Chemistry

In some reactions, a product formed acts as a catalyst. The phenomenon is called

- A. Negative Catalysis
- B. Activation of Catalyst
- C. Heterogeneous catalysis
- D. Autocatalysis ✓ **Correct answer**

A. Negative catalysis is when a substance slows a reaction, not when a product catalyses it.

B. Activation of a catalyst is not the phenomenon of a product acting as a catalyst.

C. Heterogeneous catalysis is catalysis in a different phase, not a product acting as a catalyst.

D. Autocatalysis is when a product of a reaction acts as a catalyst for that reaction.

Question 78 Chemistry

The reaction rate in forward direction decreases with the passage of time because

- A. Concentration of reactants decrease ✓ **Correct answer**
- B. Concentration of product decreases
- C. The order of reaction changes
- D. Temperature of the system changes

ction proceeds the reactants are consumed, so their concentration falls and the forward rate decreases.

B. The product concentration increases (not decreases) as the reaction proceeds.

C. The order of reaction does not change with time.

D. The temperature does not change (the rate falls because the reactant concentration falls).

Question 79 Chemistry

Which one remains same along a period?

- A. Atomic radius
- B. Melting point
- C. Number of shells (orbits) ✓ **Correct answer**
- D. Electrical conductivity

A. Atomic radius decreases along a period, it does not remain the same.

B. Melting point varies along a period, it does not remain the same.

C. All elements in the same period have the same number of electron shells.

D. Electrical conductivity varies along a period, it does not remain the same.

Question 80 Chemistry

More the ionization energy of an element:

- A. More the electropositivity
- B. More the reducing power
- C. Less the metallic character ✓ **Correct answer**
- D. Bigger the atomic radius

A. Higher ionization energy means the element holds its electrons more tightly, so it is

ositive.

B. Higher ionization energy means the element loses electrons less readily, so it has less reducing power.

C. The higher the ionization energy, the less readily the element loses electrons, so the less metallic its character.

D. Higher ionization energy is associated with a smaller atomic radius, not a bigger one.

Question 81 Chemistry

Alkaline earth metal hydroxides decompose on heating. Which of the following reactions is a correct representation of this decomposition?

- A. $M(OH)_2(s) \longrightarrow MO(s) + H_2O(l)$ ✓ **Correct answer**
- B. $MOH(s) \longrightarrow M_2O(s) + H_2O(l)$
- C. $2MOH_2(s) \longrightarrow 2MO(s) + H_2(l)$
- D. $4MOH(s) \longrightarrow 4M(s) + 2H_2O(l) + O_2$

A. Alkaline earth metal hydroxides ($M(OH)_2$) decompose on heating to the metal oxide and water.

B. MOH is an alkali metal hydroxide, not an alkaline earth metal hydroxide.

C. The decomposition gives water (H_2O), not hydrogen gas.

D. The decomposition gives the metal oxide and water, not the metal and oxygen.

Question 82 Chemistry

Carbon has the unique ability to form long chains by bonding with other carbon atoms. This property of self-linking in carbon is known as:

- A. Condensation
- B. Polymerization

- D. Catenation ✓ **Correct answer**

A. Condensation is a reaction in which two molecules join with the loss of a small molecule, not carbon's self-linking.

B. Polymerization is the joining of monomers into a polymer, not carbon's self-linking property.

C. Cyclization is the formation of a ring, not carbon's self-linking.

D. Catenation is carbon's ability to link with other carbon atoms to form long chains.

Question 83 Chemistry

Oxidation state of 'Mn' in $KMnO_4$, K_2MnO_4, MnO_2 and $MnSO_4$ is in the order:

- A. +7, +6, +2, +4
- B. +6, +7, +2, +4
- C. +7, +6, +4, +2 ✓ **Correct answer**
- D. +4, +6, +7, +2

A. Mn in MnO_2 is +4 and in $MnSO_4$ is +2, not +2 then +4.

B. Mn in $KMnO_4$ is +7 and in K_2MnO_4 is +6, not +6 then +7.

C. Mn is +7 in $KMnO_4$, +6 in K_2MnO_4, +4 in MnO_2 and +2 in $MnSO_4$.

D. Mn in $KMnO_4$ is +7, not +4.

Question 84 Chemistry

Which pair of transition elements shows abnormal electronic configuration?

- A. Sc and Zn
- B. Cu and Sc
- C. Zn and Cu

and Cr ✓ **Correct answer**

A. Sc ([Ar] $3d^1 4s^2$) and Zn ([Ar] $3d^{10} 4s^2$) have normal configurations.

B. Sc has a normal configuration; Cu is abnormal.

C. Zn has a normal configuration; Cu is abnormal.

D. Copper ([Ar] $3d^{10} 4s^1$) and chromium ([Ar] $3d^5 4s^1$) both have abnormal configurations (half-filled and fully-filled d subshells).

Question 85 Chemistry

The acid rain water has pH:

- A. Below 5 ✓ **Correct answer**
- B. 7
- C. Between 5 and 7
- D. Between 7 and 14

A. Acid rain has a pH below 5 (typically 4–5, below the 5.6 of normal rainwater).

B. pH 7 is neutral, not acid rain.

C. Acid rain is below pH 5, not between 5 and 7.

D. That is alkaline, not acid rain.

Question 86 Chemistry

In Contact Process for manufacturing sulphuric acid, Sulphur trioxide (SO_3) is not absorbed in water because

- A. The reaction does not go to completion
- B. The reaction is highly exothermic ✓ **Correct answer**
- C. The reaction is quite slow
- D. SO_3 is insoluble in water

absorbed in water because the reaction is highly exothermic (and forms a mist), not because it does not go to completion.

B. $SO_3 + H_2O$ is highly exothermic and produces a mist of sulphuric acid, so SO_3 is absorbed in concentrated H_2SO_4 (oleum) instead.

C. The reaction is fast, not slow.

D. SO_3 reacts readily with water; it is not insoluble.

Question 87 Chemistry

In modern Haber Process Plants, the temperature maintained during the process is

- A. 670 – 770 K (400 °C – 500 °C) ✓ **Correct answer**
- B. 270 – 370 K (0 °C – 100 °C)
- C. 370 – 470 K (100 °C – 200 °C)
- D. 570 – 600 K (300 °C – 380 °C)

A. The Haber process is run at about 450–500 °C (723–773 K) with an iron catalyst.

B. The Haber process is run at 400–500 °C, not 0–100 °C.

C. The Haber process is run at 400–500 °C, not 100–200 °C.

D. The Haber process is run at 400–500 °C, not 300–380 °C.

Question 88 Chemistry

In the Haber process for manufacturing of ammonia, Nitrogen is taken from

- A. Proteins occurring in living bodies
- B. Ammonium salts obtained industrially
- C. Air ✓ **Correct answer**
- D. Minerals containing nitrates

A. Nitrogen for the Haber process is taken from air, not from proteins.

for the Haber process is taken from air, not from ammonium salts.

C. Nitrogen is obtained from the air (by fractional distillation of liquid air).

D. Nitrogen for the Haber process is taken from air, not from nitrate minerals.

Question 89 Chemistry

Ethene on polymerization, gives the product polyethene. This reaction may be called as

- A. Addition ✓ **Correct answer**
- B. Condensation
- C. Substitution
- D. Pyrolysis

A. Ethene polymerizes to polyethene by addition polymerization (no small molecule is lost).

B. Condensation polymerization loses a small molecule (e.g. water); ethene to polyethene is addition.

C. Substitution replaces an atom or group; ethene to polyethene is addition.

D. Pyrolysis is decomposition by heat, not polymerization.

Question 90 Chemistry

In the following, which one is free radical?

- A. Cl^-
- B. Cl^+
- C. Cl_2
- D. Cl° (Cl•) ✓ **Correct answer**

A. Cl^- is a chloride ion (with a full octet), not a free radical.

B. Cl^+ is a chloronium ion, not a free radical.

olecule, not a free radical.

D. Cl• (the chlorine atom with one unpaired electron) is a free radical.

Question 91 Chemistry

The introduction of R—C(=O)$^{+}$ group in benzene is called

- A. Acylation ✓ **Correct answer**
- B. Carbonyl reduction
- C. Alkylation
- D. Formylation

A. Introducing an acyl group (R—CO—) into benzene (Friedel–Crafts acylation) is called acylation.

B. Carbonyl reduction reduces a C=O group, it does not introduce an acyl group into benzene.

C. Alkylation introduces an alkyl group (R—), not an acyl group (R—CO—).

D. Formylation introduces a formyl group (—CHO), not an acyl group.

Question 92 Chemistry

The alkaline hydrolysis of bromoethane shown below gives alcohol as the product: $H_3C—CH_2—Br \longrightarrow H_3C—CH_2—OH$ The reagent and the condition used in this reaction may be:

- A. H_2O at room temperature
- B. Ethanol, heat
- C. KOH in alcohol
- D. Dilute NaOH(aq) warm ✓ **Correct answer**

A. Bromoethane is hydrolysed to ethanol by dilute aqueous NaOH (warm), not by water alone at room temperature.

ith heat does not hydrolyse bromoethane to ethanol.

C. Alcoholic KOH gives dehydrohalogenation (ethene), not the alcohol.

D. Dilute aqueous NaOH (warm) hydrolyses bromoethane to ethanol (nucleophilic substitution).

Question 93 Chemistry

In the reaction of ethane with bromine the intermediate formed is

- A. Structure: cyclic bromonium ion ($H_2C—CH_2$ with Br^+ bridging) ✓ **Correct answer**
- B. Structure: $H_2C(Br)—CH_2•$ (carbon radical)
- C. Structure: $H_2C(Br)—CH_2^+$ (carbocation)
- D. Structure: $H_2C=CHBr$ (vinyl bromide)

A. The addition of bromine to ethene proceeds through the cyclic bromonium ion intermediate. (The stem prints "ethane" — evidently a misprint for "ethene", since ethane does not form this intermediate.)

B. The intermediate is the cyclic bromonium ion, not a carbon radical.

C. The intermediate is the cyclic bromonium ion, not an open carbocation.

D. Vinyl bromide is not the intermediate of bromine addition to ethene.

Question 94 Chemistry

In substitution reactions, dihaloalkane or secondary halogenoalkane give / show:

- A. S_N1 Mechanism
- B. S_N2 Mechanism
- C. Both E_1 and E_2
- D. Both S_N1 and S_N2 ✓ **Correct answer**

A. Secondary halogenoalkanes can undergo both S_N1 and S_N2 (depending on

not S_N1 alone.

B. Secondary halogenoalkanes can undergo both S_N1 and S_N2, not S_N2 alone.

C. The question asks about substitution (S_N) mechanisms, not elimination (E_1/E_2).

D. Secondary halogenoalkanes (and dihaloalkanes) can react by both S_N1 and S_N2 mechanisms.

Question 95 Chemistry

The dehydration of ethyl alcohol with concentrated H_2SO_4 at 140°C gives:

- A. Ethene
- B. Diethyl ether ✓ **Correct answer**
- C. Alcohol
- D. Carboxylic acid

A. Ethene is formed at 170 °C; at 140 °C diethyl ether is formed.

B. At 140 °C, two molecules of ethanol dehydrate intermolecularly to give diethyl ether.

C. The product is diethyl ether (an ether), not an alcohol.

D. The product is diethyl ether, not a carboxylic acid.

Question 96 Chemistry

Ethanol can be converted in to ethanoic acid by:

- A. Oxidation ✓ **Correct answer**
- B. Fermentation
- C. Hydration
- D. Hydrogenation

A. Ethanol is oxidised (e.g. by acidified $K_2Cr_2O_7$) to ethanoic acid.

tion produces ethanol from sugars, it does not convert ethanol to ethanoic acid.

C. Hydration adds water; it does not convert ethanol to ethanoic acid.

D. Hydrogenation adds hydrogen; it does not convert ethanol to ethanoic acid.

Question 97 Chemistry

The following structure is of: [R—C(R)(R)—OH — a carbon bonded to three R groups and one —OH group]

- A. Secondary alcohol
- B. Primary alcohol
- C. Tertiary alcohol ✓ **Correct answer**
- D. Carboxylic acid

A. A secondary alcohol has two R groups on the carbon bearing the —OH; this carbon has three R groups, so it is a tertiary alcohol. The official key gives A, which is wrong.

B. A primary alcohol has one R group on the carbon bearing the —OH; this carbon has three R groups.

C. The carbon bearing the —OH group is bonded to three R groups, so this is a tertiary alcohol.

D. The structure has an —OH group (not —COOH) and no carbonyl group, so it is an alcohol, not a carboxylic acid.

Question 98 Chemistry

When ethanol is warmed with ethanoic acid in the presence of strong acid catalyst, an ester ethyl ethanoate is formed. $CH_3CH_2OH + CH_3CO_2H \longrightarrow CH_3CO_2CH_2CH_3$ During this reaction:

- A. Alcohol is reduced

- C. O–H bond in ethanol is broken ✓ **Correct answer**
- D. Acid is oxidized

A. No reduction occurs in esterification; the O–H bond of the alcohol is broken.

B. In esterification the C–OH bond of the acid breaks (the —OH is lost as water); the O–H bond broken is that of the alcohol.

C. In esterification the alcohol's O–H bond breaks (its hydrogen is lost as water with the acid's —OH group).

D. No oxidation occurs in esterification.

Question 99 Chemistry

Primary alcohols normally give us aldehydes when oxidized in the presence of $Na_2Cr_2O_7$, what the product will be, when the secondary alcohols are oxidized in same conditions?

- A. Alkenes
- B. Alkynes
- C. Alkyl halides
- D. Ketones ✓ **Correct answer**

A. Secondary alcohols give ketones on oxidation, not alkenes.

B. Secondary alcohols give ketones on oxidation, not alkynes.

C. Secondary alcohols give ketones on oxidation, not alkyl halides.

D. Secondary alcohols are oxidised to ketones (e.g. propan-2-ol to propanone).

Question 100 Chemistry

Formaldehyde reacts with HCN (NaCN + HCl) to give a compound:

- A. Structure: $H_3C-C(OH)(H)-CN$

- C. Structure: $H_3C—C(OH)(CH_3)—CN$
- D. Structure: $H_3C—C(=O)—CN$

A. That is the cyanohydrin of acetaldehyde (lactonitrile), not of formaldehyde.

B. Formaldehyde (HCHO) adds HCN to give its cyanohydrin, $HO—CH_2—CN$ (glycolonitrile).

C. That is the cyanohydrin of acetone, not of formaldehyde.

D. That is pyruvonitrile (acetyl cyanide), not the cyanohydrin of formaldehyde.

Question 101 Chemistry

Iodoform test will not be positive with:

- A. Structure: $H_3C—CH_2—C(=O)—CH_2—CH_3$ ✓ **Correct answer**
- B. Structure: $H_3C—CH_2—C(=O)—CH_3$
- C. C_2H_5OH
- D. Structure: $H_3C—C(=O)—H$

A. Pentan-3-one has no $CH_3CO—$ (or $CH_3CH(OH)—$) group, so the iodoform test is negative.

B. Butan-2-one has a $CH_3CO—$ group, so the iodoform test is positive.

C. Ethanol has a $CH_3CH(OH)—$ group, so the iodoform test is positive.

D. Acetaldehyde has a $CH_3CO—$ group, so the iodoform test is positive.

Question 102 Chemistry

When $CH_3—CH_2—OH$ is oxidized in the presence of $K_2Cr_2O_7$ and H_2SO_4, the product formed is

- A. Structure: $H_3C—C(=O)—OH$ ✓ **Correct answer**
- B. Structure: $H—C(=O)—OH$
- C. Structure: $H_3C—C(=O)—CH_3$

ucture: $H_3C—C(=O)—OCH_3$

A. Ethanol is oxidised by acidified $K_2Cr_2O_7$ to ethanoic acid, CH_3COOH.

B. That is formic acid (methanoic acid), the oxidation product of methanol, not of ethanol.

C. That is acetone (propanone), the oxidation product of a secondary alcohol, not of ethanol.

D. That is methyl ethanoate, an ester, not the oxidation product of ethanol.

Question 103 English

He had a heart attack and all attempts to _____ him failed.

- A. Renew
- B. Resuscitate ✓ **Correct answer**
- C. Revise
- D. Refurnish

A. "Renew him" does not fit a heart-attack victim.

B. To resuscitate is to revive someone whose heart has stopped; all attempts to resuscitate him failed.

C. "Revise him" is meaningless here.

D. "Refurnish him" is meaningless here.

Question 104 English

The _____ stench of dead animals and plants made Mumtaz ill.

- A. Putrid ✓ **Correct answer**
- B. Purified
- C. Perturbed
- D. Purchased

ench" means a rotten, foul smell, which fits dead animals and plants.

B. "Purified stench" is contradictory; a stench is not purified.

C. "Perturbed" means disturbed or agitated, not a kind of smell.

D. "Purchased stench" is meaningless here.

Question 105 English

While going up the hills, by bus, she felt _____ inside.

- A. Fishy
- B. Itchy
- C. Queasy ✓ **Correct answer**
- D. Squeezy

A. "Fishy" means suspicious, not a feeling of travel sickness.

B. "Itchy" means an irritation of the skin, not travel sickness.

C. To feel queasy is to feel nauseous, as on a winding bus journey up hills.

D. "Squeezy" is not the word for travel sickness.

Question 106 English

The craft statesman manipulated the situation by making false promises and declaring sport festivities as a _____ to fool the public.

- A. Red-Hearing
- B. Red-Feather
- C. Red-Herring ✓ **Correct answer**
- D. Red-Haring

A. There is no such idiom as "red-hearing".

o such idiom as "red-feather".

C. A "red herring" is something that distracts attention from the real issue — exactly what the statesman used to fool the public.

D. There is no such idiom as "red-haring".

Question 107 English

SPOT THE ERROR: The theory was discarded as there was no corroborating evidence for its favour. [The underlined segments are: A "discarded", B "as", C "there", D "for".]

- A. discarded
- B. as
- C. there
- D. for ✓ **Correct answer**

A. "The theory was discarded" is correct.

B. "As there was no corroborating evidence" is correct.

C. "There was no corroborating evidence" is correct.

D. The idiom is "in its favour", not "for its favour" — so the error is in segment D.

Question 108 English

SPOT THE ERROR: The workers were raising much hue and cry when their demands were turned away. [The underlined segments are: A "raising", B "much", C "demands", D "away".]

- A. raising
- B. much
- C. demands
- D. away ✓ **Correct answer**

sing hue and cry" is correct.

B. "Much hue and cry" is correct.

C. "Their demands" is correct.

D. Demands are "turned down", not "turned away" (people are turned away) — so the error is in segment D.

Question 109 English

SPOT THE ERROR: Aslam was badly cudgeled from his step-brother. He received many bruises and contusions. Thank God! No injury was serious. [The underlined segments are: A "from", B "bruises", C "Thank God!", D "was".]

- A. from ✓ **Correct answer**
- B. bruises
- C. Thank God!
- D. was

A. He was cudgeled "by" his step-brother, not "from" him — so the error is in segment A.

B. "Many bruises and contusions" is correct.

C. "Thank God!" is a correct exclamation here.

D. "No injury was serious" is correct subject-verb agreement.

Question 110 English

SPOT THE ERROR: I extend a cordial invitation for you to visit our farm house. We have grown vegetables without chemical fertilizers over there. [The underlined segments are: A "for", B "to", C "grown", D "over".]

- A. for ✓ **Correct answer**
- B. to

- D. over

A. The idiom is "an invitation to you", not "an invitation for you" — so the error is in segment A.

B. "To visit our farm house" is correct.

C. "We have grown vegetables" is correct.

D. "Over there" is correct.

Question 111 English

SPOT THE ERROR: Although he is not a close relative of me, yet I was greeted with a show of deep cordiality. [The underlined segments are: A "me", B "greeted", C "a", D "of".]

- A. me ✓ **Correct answer**
- B. greeted
- C. a
- D. of

A. The correct form is "a close relative of mine", not "of me" — so the error is in segment A.

B. "I was greeted" is correct.

C. "With a show of deep cordiality" is correct.

D. "A show of deep cordiality" is correct.

Question 112 English

SPOT THE ERROR: This antibiotic destroys red corpuscles in the blood and cause pernicious anaemia. [The underlined segments are: A "destroys", B "in", C "the", D

- A. destroys
- B. in
- C. the
- D. cause ✓ **Correct answer**

A. "Destroys" agrees with the singular subject "antibiotic" and is correct.

B. "In the blood" is correct.

C. "The blood" is correct.

D. The singular subject "antibiotic" needs "causes", not "cause" — so the error is in segment D.

Question 113 English

Choose the CORRECT sentence:

- A. Why does not Nomana remained true to her husband?
- B. Why did not Nomana remain true to her husband? ✓ **Correct answer**
- C. Why had not Nomana remain true to her husband?
- D. Why did not Nomana remained true to her husband?

A. "Does not" with "remained" is wrong: after the auxiliary "does", the verb must be "remain".

B. Correct: "did" + base verb "remain", with the negative in the standard inverted form.

C. "Had not" with "remain" is the wrong tense and form for this question.

D. "Did not" with "remained" is wrong: after "did", the verb must be "remain".

Question 114 English

Choose the CORRECT sentence:

- B. All my childhood, I longed desperately to a tricycle.
- C. All my childhood, I longed desperately for a tricycle. ✓ **Correct answer**
- D. All my childhood, I longed desperately at a tricycle.

A. "Longed in for" is not idiomatic.

B. "Longed to a tricycle" is wrong; one longs "for" something.

C. Correct: "to long for" is the idiom for desiring something.

D. "Longed at" is not idiomatic.

Question 115 English

Choose the CORRECT sentence:

- A. She felt unreal to the voice informed her of the subway accident.
- B. She felt unreal as the voice informed her of the subway accident. ✓ **Correct answer**
- C. She felt unreal that the voice informed her of the subway accident.
- D. She felt unreal for the voice informed her of the subway accident.

A. "To the voice informed her" is ungrammatical.

B. Correct: "as" = while, joining the two clauses properly.

C. "That the voice informed her" does not fit after "felt unreal".

D. "For the voice informed her" is not the correct conjunction here.

Question 116 English

Choose the CORRECT sentence:

- A. Bill Gates is one of the wealthiest person in the world.
- B. Bill Gates is one of the wealthy person in the world.

- Gates is one of the wealthiest persons in the world. ✓ **Correct answer**
- D. Bill Gates is one of the more wealthy person in the world.

A. "One of" must be followed by a plural noun ("persons"), not the singular "person".

B. "One of" needs the superlative "wealthiest" and a plural noun.

C. Correct: superlative "wealthiest" with the plural "persons" after "one of".

D. "One of" needs the superlative, not the comparative "more wealthy", and a plural noun.

Question 117 English

Choose the CORRECT sentence:

- A. Her father is a SP in the Punjab Police.
- B. Her father was a SP in the Punjab Police.
- C. Her father is an SP in the Punjab Police. ✓ **Correct answer**
- D. Her father are a SP in the Punjab Police.

A. "SP" is pronounced "ess-pee", beginning with a vowel sound, so it takes "an", not "a".

B. Wrong article ("a" before a vowel sound) and the wrong tense for the intended present fact.

C. Correct: "an" before the vowel sound of "SP", present tense "is".

D. "Are" does not agree with the singular subject "father".

Question 118 English

Choose the CORRECT sentence:

- A. There were musical instruments in the shop. ✓ **Correct answer**
- B. There was musical instruments in the shop.
- C. There has musical instruments in the shop.
- D. There is musical instruments in the shop.

lural "instruments" takes the plural verb "were".

B. "Was" is singular and does not agree with plural "instruments".

C. "Has" cannot follow "there" in this construction.

D. "Is" is singular and does not agree with plural "instruments".

Question 119 English

Choose the CORRECT sentence:

- A. He died for heart attack in 1982.
- B. He died with heart attack in 1982.
- C. He died in heart attack in 1982.
- D. He died of heart attack in 1982. ✓ **Correct answer**

A. One dies "of" a cause, not "for" it.

B. "Died with" is not the idiom for the cause of death.

C. "Died in" is not the idiom for the cause of death.

D. Correct: "to die of" is the idiom for the cause of death.

Question 120 English

Choose the CORRECT sentence:

- A. Always speak in the truth.
- B. Always tell for the truth.
- C. Always tell the truth. ✓ **Correct answer**
- D. Always telling truth.

A. The idiom is "speak the truth", not "speak in the truth".

B. "Tell for the truth" is not idiomatic.

D. "Always telling truth" is a fragment without a finite verb and omits the article.

Question 121 English

Choose the CORRECT sentence:

- A. Hand up the answer sheet to me.
- B. Hand over the answer sheet to me. ✓ **Correct answer**
- C. Hand down the answer sheet to me.
- D. Hand for the answer sheet to me.

A. "Hand up" is not the idiom for giving something to someone.

B. Correct: "hand over" means to give or deliver.

C. "Hand down" means to pass on to a later generation, not to give here.

D. "Hand for" is not idiomatic.

Question 122 English

Choose the CORRECT sentence:

- A. Are you noticed the peach blossoms?
- B. Have you noticed the peach blossoms? ✓ **Correct answer**
- C. Will you noticed the peach blossoms?
- D. Were you noticed the peach blossoms?

A. "Are you noticed" is ungrammatical.

B. Correct: present perfect "have noticed".

C. "Will you noticed" is wrong: after "will", the verb must be "notice".

D. "Were you noticed" is passive and wrong here.

123 English

DISSONANCE

- A. Inconsistency ✓ **Correct answer**
- B. Expansion
- C. Perceptible
- D. Warp

A. "Dissonance" means a lack of harmony or agreement — nearest to "inconsistency".

B. "Expansion" is not the meaning of "dissonance".

C. "Perceptible" means noticeable, not the meaning of "dissonance".

D. "Warp" means to bend or distort, not the meaning of "dissonance".

Question 124 English

TRIFLE

- A. Pudding
- B. Minor ✓ **Correct answer**
- C. Deluge
- D. Treble

A. A trifle is a dessert, but the nearest meaning of "trifle" as a thing of little value is not "pudding".

B. A "trifle" is something of little value or importance — nearest to "minor".

C. "Deluge" means a flood, the opposite of a trifle.

D. "Treble" means threefold, not the meaning of "trifle".

125 English

MURKY

- A. Dusty
- B. Squeamy
- C. Clear
- D. Unclear ✓ **Correct answer**

A. "Dusty" means covered in dust, not the meaning of "murky".

B. "Squeamy" (squeamish) means easily disgusted, not the meaning of "murky".

C. "Clear" is the opposite of "murky".

D. "Murky" means dark, gloomy or hard to see through — nearest to "unclear".

Question 126 English

FAUX

- A. Blunder
- B. Mistake
- C. Indiscretion
- D. False ✓ **Correct answer**

A. A "blunder" is a clumsy mistake, not the meaning of "faux".

B. A "mistake" is an error, not the meaning of "faux".

C. "Indiscretion" is a lapse in judgement, not the meaning of "faux".

D. "Faux" is French for false or artificial — nearest to "false".

Question 127 English

MYRIAD

ntable

- B. Multitude ✓ **Correct answer**
- C. Measured
- D. Blurred

A. "Countable" is the opposite of the sense of "myriad" (a countless number).

B. A "myriad" is a very large number — nearest to "multitude".

C. "Measured" is not the meaning of "myriad".

D. "Blurred" is not the meaning of "myriad".

Question 128 English

FACILE

- A. Fallacy
- B. Depict
- C. Delicate
- D. Superficial ✓ **Correct answer**

A. A "fallacy" is a false belief, not the meaning of "facile".

B. "Depict" means to portray, not the meaning of "facile".

C. "Delicate" means fragile or fine, not the meaning of "facile".

D. "Facile" means done too easily and without depth — nearest to "superficial".

Question 129 English

MAGNUM

- A. Masterpiece ✓ **Correct answer**
- B. Magnanimity
- C. Modest

A. "Magnum" (as in magnum opus) means a great work — nearest to "masterpiece".

B. "Magnanimity" means generosity, not the meaning of "magnum".

C. "Modest" is the opposite of the grandeur of "magnum".

D. "Magnetic" means attractive, not the meaning of "magnum".

Question 130 English

SIDLE

- A. Sneak ✓ **Correct answer**
- B. Sift
- C. Siege
- D. Sieve

A. To "sidle" is to move sideways in a sly, stealthy way — nearest to "sneak".

B. "Sift" means to sort or pass through, not the meaning of "sidle".

C. A "siege" is a blockade, not the meaning of "sidle".

D. A "sieve" is a straining device, not the meaning of "sidle".

Question 131 English

PLETHORA

- A. Plastic
- B. Super-fluidity ✓ **Correct answer**
- C. Measure
- D. Malleable

A. "Plastic" means flexible or synthetic, not the meaning of "plethora".

"plethora" is an excess or overabundance — nearest here to "super-fluidity" (an excess of fluid).

C. "Measure" is not the meaning of "plethora".

D. "Malleable" means able to be shaped, not the meaning of "plethora".

Question 132 English

VERTEX

- A. Poetry
- B. Depth
- C. Zenith ✓ **Correct answer**
- D. Diminish

A. "Poetry" is not the meaning of "vertex".

B. "Depth" is the opposite direction to a vertex (a highest point).

C. A "vertex" is the highest point — nearest to "zenith".

D. "Diminish" means to reduce, not the meaning of "vertex".

Question 133 Biology

The part of neuron fibre which conducts nerve impulses from the cell body is

- A. Dendron
- B. Dendrites
- C. Axon ✓ **Correct answer**
- D. Peripheral branch

A. A dendron is a single branch of a dendrite, which carries impulses towards the cell body, not away from it.

B. Dendrites carry nerve impulses towards the cell body, not away from it.

s the long fibre that conducts nerve impulses away from the cell body.

D. "Peripheral branch" is not the part that conducts impulses away from the cell body.

Question 134 Biology

The number of cranial nerves in human is

- A. 31 pairs
- B. 12 pairs ✓ **Correct answer**
- C. 24 pairs
- D. 62 pairs

A. 31 pairs is the number of spinal nerves, not cranial nerves.

B. Humans have 12 pairs of cranial nerves.

C. 24 is the number of individual cranial nerves (12 pairs), not the number of pairs.

D. 62 pairs is not the number of cranial nerves in humans.

Question 135 Biology

The part of brain which controls breathing, heart rate and swallowing is

- A. Cerebrum
- B. Cerebellum
- C. Medulla ✓ **Correct answer**
- D. Hypothalamus

A. The cerebrum controls higher functions such as thought and voluntary movement, not breathing and heart rate.

B. The cerebellum coordinates movement and balance, not breathing and heart rate.

C. The medulla (medulla oblongata) controls involuntary actions including breathing, heart rate and swallowing.

halamus controls temperature and hunger, not breathing and heart rate.

Question 136 Biology

Syphilis is a sexually transmitted disease which is caused by

- A. Neisseria gonorrhoeae
- B. E. coli
- C. Treponema pallidum ✓ **Correct answer**
- D. Mycobacterium avium

A. Neisseria gonorrhoeae causes gonorrhoea, not syphilis.

B. E. coli causes gut and urinary infections, not syphilis.

C. Syphilis is caused by the bacterium Treponema pallidum.

D. Mycobacterium avium causes lung and disseminated infections, not syphilis.

Question 137 Biology

Discharge of ovum or secondary oocyte from ovary or from Graafian follicle is called

- A. Fertilization
- B. Pollination
- C. Follicle formation
- D. Ovulation ✓ **Correct answer**

A. Fertilization is the fusion of sperm and ovum, not the release of the ovum.

B. Pollination is the transfer of pollen in plants, not the release of the ovum.

C. Follicle formation is the development of the follicle, not the discharge of the ovum.

D. Ovulation is the discharge of the ovum (secondary oocyte) from the Graafian follicle.

138 Biology

Second meiotic division in the secondary oocyte proceeds as far as

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

A. The second meiotic division in the secondary oocyte is arrested at metaphase II until fertilization.

B. The division proceeds past prophase II to metaphase II.

C. Anaphase II occurs only after fertilization triggers completion of meiosis II.

D. Telophase II occurs only after fertilization triggers completion of meiosis II.

Question 139 Biology

Which one of the following differentiates directly into mature sperm?

- A. Primary spermatocyte
- B. Secondary spermatocyte
- C. Spermatogonia
- D. Spermatid ✓ **Correct answer**

A. The primary spermatocyte divides by meiosis I; it does not differentiate directly into a sperm.

B. The secondary spermatocyte divides by meiosis II; it does not differentiate directly into a sperm.

C. Spermatogonia divide by mitosis to produce spermatocytes; they do not differentiate directly into sperm.

D. The spermatid differentiates directly (by spermiogenesis) into a mature sperm.

140 Biology

Uterus opens into the vagina through

- A. Cervix ✓ **Correct answer**
- B. Fallopian tube
- C. External genitalia
- D. Vulva

A. The uterus opens into the vagina through the cervix.

B. The fallopian tube connects the ovary to the uterus, not the uterus to the vagina.

C. The external genitalia are outside the vagina, not the opening of the uterus.

D. The vulva is the external opening of the vagina, not the opening of the uterus into the vagina.

Question 141 Biology

Each muscle fibre is surrounded by membrane which is called

- A. Sarcomere
- B. Sarcolemma ✓ **Correct answer**
- C. Twitch fibre
- D. Capsule

A. A sarcomere is the contractile unit between two Z-lines, not the membrane around a muscle fibre.

B. The sarcolemma is the membrane surrounding each muscle fibre.

C. "Twitch fibre" is a type of muscle fibre, not its surrounding membrane.

D. A capsule is not the membrane surrounding a muscle fibre.

142 Biology

When calcium ions are released from the sarcoplasmic reticulum they bind with _____ during muscle contraction

- A. Tropomyosin
- B. Sarcolemma
- C. Cytosol's ions
- D. Troponin ✓ **Correct answer**

A. Tropomyosin is the protein that blocks the myosin-binding sites; calcium binds troponin, which moves tropomyosin aside.

B. The sarcolemma is the muscle fibre membrane; calcium does not bind to it.

C. Calcium ions do not bind with "cytosol's ions" during contraction.

D. Released calcium ions bind to troponin, exposing the myosin-binding sites on actin.

Question 143 Biology

Human and mammalian skeleton can be divided into two parts, axial skeleton and

- A. Appendicular skeleton ✓ **Correct answer**
- B. Exoskeleton
- C. Endoskeleton
- D. Hydrostatic skeleton

A. The skeleton is divided into the axial skeleton and the appendicular skeleton (limbs and girdles).

B. An exoskeleton is an external skeleton, as in insects; humans do not have one.

C. "Endoskeleton" is the general term for the whole internal skeleton, not the second division.

D. A hydrostatic skeleton is a fluid-filled body cavity, as in earthworms, not a division of

skeleton.

Question 144 Biology

Last four vertebrae in humans are fused to form a structure called

- A. Sacrum
- B. Cervical vertebrae
- C. Pubis
- D. Coccyx ✓ **Correct answer**

A. The sacrum is formed by the fusion of five sacral vertebrae, not the last four.

B. The cervical vertebrae are the seven neck vertebrae, not the fused last four.

C. The pubis is a bone of the pelvis, not fused vertebrae.

D. The last four (3–5) vertebrae fuse to form the coccyx (tail bone).

Question 145 Biology

How many bones are involved in the formation of each half of pelvic girdle?

- A. 3 bones ✓ **Correct answer**
- B. 4 bones
- C. 2 bones
- D. 1 bone

A. Each half of the pelvic girdle (os innominatum) is formed by three fused bones: ilium, ischium and pubis.

B. Only three bones form each half of the pelvic girdle.

C. Three, not two, bones form each half of the pelvic girdle.

D. The adult hip bone is one fused bone, but it is formed from three bones.

146 Biology

Ductless glands are known as

- A. Endocrine gland ✓ **Correct answer**
- B. Exocrine gland
- C. Salivary glands
- D. Bile glands

A. Ductless glands are endocrine glands, which secrete hormones directly into the blood.

B. Exocrine glands have ducts; they are not ductless.

C. Salivary glands are exocrine glands with ducts.

D. Bile glands (liver) have ducts; they are not ductless glands.

Question 147 Biology

Gastrin is the hormone which is produced by the

- A. Liver
- B. Pyloric region of stomach ✓ **Correct answer**
- C. Adrenal gland
- D. Mucosal lining of intestine

A. The liver does not produce gastrin.

B. Gastrin is produced by G cells in the pyloric antrum (pyloric region) of the stomach.

C. The adrenal gland produces adrenaline and corticosteroids, not gastrin. The official key gives C, which is wrong.

D. Gastrin is produced mainly in the stomach, not the intestinal mucosa (the duodenum has only a small number of G cells).

148 Biology

β-cells of liver secrete a hormone that is called

- A. Insulin
- B. Glucagon
- C. Antidiuretic hormone
- D. Gastrin

No answer is given for this question, and none is taught. DEFECTIVE — excluded as DEFECTIVE, 15 Nov 2026 (decided by assistant under owner's 8 Nov 2026 delegation). The stem is false: the liver has no β-cells — β-cells are in the islets of Langerhans of the pancreas, where they secrete insulin. No option is correct as asked, and the official key itself gives X (no correct answer) for this question. This question must never be taught as having an answer.

Question 149 Biology

Vasopressin and Oxytocin are released from the

- A. Placenta
- B. Ovary
- C. Anterior pituitary
- D. Posterior pituitary ✓ **Correct answer**

A. The placenta does not release vasopressin and oxytocin.

B. The ovary does not release vasopressin and oxytocin.

C. The anterior pituitary synthesises and releases other hormones (e.g. GH, ACTH); vasopressin and oxytocin are released from the posterior pituitary.

D. Vasopressin (ADH) and oxytocin, made in the hypothalamus, are released from the posterior pituitary.

150 Biology

Antigen is a foreign protein or any other molecule which stimulates the formation of

- A. MHC complex
- B. Immunogen
- C. Mucus
- D. Antibodies ✓ **Correct answer**

A. An antigen is presented by the MHC complex, but the antigen stimulates the formation of antibodies.

B. "Immunogen" is another name for an antigen itself, not what the antigen stimulates.

C. An antigen does not stimulate the formation of mucus.

D. An antigen stimulates the immune system to form antibodies against it.

Question 151 Biology

Antibodies are produced by which of the following lymphocytes?

- A. B lymphocytes ✓ **Correct answer**
- B. A lymphocytes
- C. T lymphocytes
- D. B and T lymphocytes

A. Antibodies are produced by B lymphocytes (plasma cells).

B. There is no "A lymphocyte" class that produces antibodies.

C. T lymphocytes mediate cell-mediated immunity; they do not produce antibodies.

D. Only B lymphocytes produce antibodies; T lymphocytes do not.

152 Biology

T-lymphocytes become mature and competent under the influence of

- A. Liver
- B. Bursa of fabricius
- C. Thymus gland ✓ **Correct answer**
- D. Spleen

A. The liver is not where T-lymphocytes mature.

B. The bursa of Fabricius is where B-lymphocytes mature in birds.

C. T-lymphocytes mature and become competent in the thymus gland.

D. The spleen filters blood and houses lymphocytes, but T-lymphocytes do not mature there.

Question 153 Biology

Skin and mucous membranes are part of the body defense system and they form the

- A. Physical barrier ✓ **Correct answer**
- B. Mechanical barriers
- C. Chemical barriers
- D. Biological barriers

A. Skin and mucous membranes form the first-line physical barrier of defence.

B. Skin and mucous membranes are classed as physical (not mechanical) barriers in this syllabus.

C. Chemical barriers are secretions such as lysozyme and stomach acid, not skin itself.

D. Biological barriers are living organisms (e.g. normal flora), not skin and mucous membranes.

154 Biology

Snake bite is treated with which type of immunization?

- A. Active
- B. Passive ✓ **Correct answer**
- C. Humoral
- D. Specific

A. Active immunization (vaccination) builds immunity slowly; a snake bite needs ready-made antivenom at once.

B. Snake-bite antivenom is passive immunization: ready-made antibodies are injected.

C. "Humoral" describes antibody-mediated immunity in general, not the type of immunization used.

D. "Specific" is not the type of immunization used for snake bite.

Question 155 Biology

The product(s) of cyclic photophosphorylation is / are:

- A. ATP ✓ **Correct answer**
- B. NADP
- C. NADP and ATP
- D. NADP, ATP, and O_2

A. Cyclic photophosphorylation produces only ATP; no NADPH is formed and no oxygen is released.

B. NADP is not a product of cyclic photophosphorylation.

C. NADPH is produced only in non-cyclic photophosphorylation.

D. Oxygen is released only in non-cyclic photophosphorylation (photolysis of water).

156 Biology

Total NADH formed by one glucose molecule during Krebs's Cycle are

- A. 6 ✓ **Correct answer**
- B. 3
- C. 8
- D. 18

A. Each turn of the Krebs cycle yields 3 NADH; one glucose gives two acetyl-CoA, so 2 × 3 = 6 NADH.

B. 3 NADH are formed per turn of the cycle, but one glucose drives two turns.

C. 8 is not the number of NADH formed per glucose in the Krebs cycle.

D. 18 is not the number of NADH formed per glucose in the Krebs cycle.

Question 157 Biology

The terminal electron acceptor in electron transport chain is

- A. Hydrogen
- B. Iron
- C. Cytochrome
- D. Oxygen ✓ **Correct answer**

A. Hydrogen is not the terminal electron acceptor.

B. Iron is a component of cytochromes, not the terminal acceptor.

C. Cytochromes pass electrons along the chain; they are not the terminal acceptor.

D. Oxygen is the final electron acceptor, combining with electrons and protons to form water.

158 Biology

The end product of glycolysis is

- A. ADP
- B. Reduced FAD
- C. Citric acid
- D. Pyruvate ✓ **Correct answer**

A. ADP is a reactant/energy carrier in glycolysis, not its end product.

B. $FADH_2$ is produced in the Krebs cycle, not as the end product of glycolysis.

C. Citric acid is formed in the Krebs cycle, not in glycolysis.

D. Glycolysis converts glucose into two molecules of pyruvate.

Question 159 Biology

One molecule of $FADH_2$ is produced in Krebs's cycle during conversion of

- A. Fumarate Malate
- B. Succinate Fumarate ✓ **Correct answer**
- C. Malate Oxaloacetate
- D. α-Ketoglutarate Succinate

A. The fumarate-to-malate step is a hydration; no $FADH_2$ is produced.

B. Succinate is oxidised to fumarate by succinate dehydrogenase, producing $FADH_2$.

C. The malate-to-oxaloacetate step produces NADH, not $FADH_2$.

D. The α-ketoglutarate-to-succinate step produces NADH and GTP, not $FADH_2$.

Question 160 Biology

In recombinant DNA technology _____ are tools for manipulating DNA

ses

- B. Chromosomes
- C. Enzymes ✓ **Correct answer**
- D. Genes

A. Viruses can act as vectors, but the tools for cutting and joining DNA are enzymes.

B. Chromosomes are not the tools used to manipulate DNA.

C. Restriction enzymes and ligases are the tools used to cut and join DNA.

D. Genes are the material being manipulated, not the tools.

Question 161 Biology

In DNA finger printing process, the use of _____ produces distinctive pattern on autoradiography or X-ray film

- A. Restriction enzyme
- B. Microsatellites
- C. Macrosatellites
- D. Probes for genetic markers ✓ **Correct answer**

A. Restriction enzymes cut the DNA into fragments, but they do not produce the pattern on the film.

B. Microsatellites are the repeated sequences analysed, but the pattern on the film is produced by the labelled probes binding to them.

C. Macrosatellites are long repeats, but the visible pattern is produced by the probes.

D. Radioactively labelled probes bind to the DNA fragments and produce the distinctive banding pattern on the autoradiograph.

162 Biology

In the recombinant DNA technology plasmids are used as

- A. Genetic material
- B. Enzymes
- C. Vectors ✓ **Correct answer**
- D. Probes

A. Plasmids carry the inserted gene, but their role in the technology is as vectors.

B. Plasmids are not enzymes.

C. Plasmids are used as vectors to carry foreign DNA into host cells.

D. Probes are labelled DNA sequences used for detection, not plasmids.

Question 163 Biology

In which process, multiple copies of the desired genes are produced?

- A. Polymerase chain reaction ✓ **Correct answer**
- B. Gene sequencing
- C. Analyzing DNA
- D. DNA finger printing

A. PCR amplifies a DNA segment to produce many copies of the desired gene.

B. Gene sequencing reads the base order; it does not produce multiple copies.

C. Analysing DNA does not produce multiple copies of a gene.

D. DNA fingerprinting identifies individuals from DNA patterns; it does not produce multiple copies of a gene.

164 Biology

The enzyme adenosine deaminase is missing in person suffering from:

- A. Cystic fibrosis
- B. Hypercholesterolemia
- C. Severe combined immunodeficiency syndrome ✓ **Correct answer**
- D. Parkinson's disease

A. Cystic fibrosis is caused by a defective CFTR chloride channel, not by missing adenosine deaminase.

B. Hypercholesterolemia is caused by defective LDL receptors, not by missing adenosine deaminase.

C. ADA deficiency causes severe combined immunodeficiency (SCID), because toxic metabolites kill developing lymphocytes.

D. Parkinson's disease is caused by loss of dopamine-producing neurons, not by missing adenosine deaminase.

Question 165 Biology

What is the niche of an organism in an ecosystem?

- A. Role played by many organisms in an ecosystem
- B. Role played by a dead organism in an ecosystem
- C. Role played by community of microorganisms in their ecosystem
- D. Role played by an organism in its ecosystem. ✓ **Correct answer**

A. A niche is the role of one organism (or species), not of many organisms together.

B. A niche is the role of a living organism, not a dead one.

C. A niche is the role of a single organism/species, not of a whole community.

D. The niche is the functional role an organism plays in its ecosystem, including its habitat,

eractions.

Question 166 Biology

The distinct levels or links of food chain are called

- A. Trophic level ✓ **Correct answer**
- B. Food web
- C. Energy pyramid
- D. Food chain

A. Each distinct feeding level or link in a food chain is a trophic level.

B. A food web is a network of interlinked food chains, not a single level.

C. An energy pyramid shows energy at each trophic level, but the levels themselves are trophic levels.

D. A food chain is the whole sequence, not one of its levels.

Question 167 Biology

A relationship between two or more organisms of different species in which all partners get benefit is called

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

A. Symbiosis (mutualism) is a relationship in which both partners benefit.

B. In parasitism one organism benefits and the other is harmed.

C. In commensalism one organism benefits and the other is unaffected.

D. In predation one organism kills and eats another.

168 Biology

Bacteria and fungi are examples of

- A. Producers
- B. Decomposers ✓ **Correct answer**
- C. Consumers
- D. Denvers

A. Producers (plants) make their own food by photosynthesis; bacteria and fungi do not.

B. Bacteria and fungi break down dead organic matter, returning nutrients to the soil.

C. Consumers feed on other living organisms; bacteria and fungi are decomposers.

D. "Denvers" is not a category in a food chain.

Question 169 Biology

The cause of acid rain is

- A. Oxides of carbon
- B. Oxides of nitrogen and Sulphur ✓ **Correct answer**
- C. Oxides of Sulphur
- D. Oxides of nitrogen

A. Carbon oxides (CO_2) cause the greenhouse effect, not acid rain.

B. Sulphur dioxide and nitrogen oxides dissolve in rainwater to form sulphuric and nitric acids — acid rain.

C. Sulphur oxides alone are only part of the cause; nitrogen oxides also contribute.

D. Nitrogen oxides alone are only part of the cause; sulphur oxides also contribute.

170 Biology

When the presence of a gene at one locus suppresses the effect of a gene at another locus, the phenomenon is called

- A. Hypostasis
- B. Pleiotropy
- C. Epistasis ✓ **Correct answer**
- D. Epitropy

A. Hypostasis is the gene whose effect is suppressed, not the phenomenon itself.

B. Pleiotropy is one gene affecting several traits, not suppression between loci.

C. Epistasis is the suppression of a gene at one locus by a gene at another locus.

D. "Epitropy" is not a genetic term.

Question 171 Biology

The gene for ABO-blood group systems in humans is represented by symbol:

- A. X
- B. I ✓ **Correct answer**
- C. Y
- D. O

A. X is the sex chromosome, not the symbol of the ABO gene.

B. The ABO blood-group gene is represented by the symbol I (alleles I^A, I^B, i).

C. Y is the male sex chromosome, not the symbol of the ABO gene.

D. O is a blood-group phenotype, not the symbol of the ABO gene.

172 Biology

When a single gene affects two or more traits, the phenomenon is called

- A. Epistasis
- B. Pleiotropy ✓ **Correct answer**
- C. Dominance
- D. Over dominance

A. Epistasis is the interaction between genes at different loci, not one gene affecting several traits.

B. Pleiotropy is the phenomenon of a single gene affecting two or more traits.

C. Dominance is the masking of a recessive allele by a dominant one.

D. Overdominance is when the heterozygote is superior to either homozygote.

Question 173 Biology

The comparative embryology of all vertebrates shows development of

- A. Hairs
- B. Gill pouches ✓ **Correct answer**
- C. Scales
- D. Fins

A. Hairs develop only in mammals, not in all vertebrate embryos.

B. All vertebrate embryos develop gill pouches (pharyngeal pouches), evidence of common ancestry.

C. Scales develop in fishes and reptiles, not in all vertebrate embryos.

D. Fins develop only in fishes, not in all vertebrate embryos.

174 Biology

In men, sex-determination depends upon the nature of

- A. Heterogametic male ✓ **Correct answer**
- B. Homogametic female
- C. Heterogametic female
- D. Homogametic male

A. In humans the male is heterogametic (XY), and the sperm determines the sex of the child.

B. The female is homogametic (XX), but sex is determined by the male gamete.

C. In humans the female is homogametic, not heterogametic.

D. In humans the male is heterogametic, not homogametic.

Question 175 Biology

Population of different species (plants and animals) living in the same habitat form a

- A. Community ✓ **Correct answer**
- B. Ecosystem
- C. Biosphere
- D. Microhabitat

A. Populations of different species living together in one habitat form a community.

B. An ecosystem is a community plus its non-living environment.

C. The biosphere is the whole life-supporting zone of the Earth.

D. A microhabitat is a small part of a habitat, not a group of populations.

176 Biology

The part of the body which forms a structural and functional unit and is composed of more than one tissue is called

- A. Organ ✓ **Correct answer**
- B. Organelle
- C. Organ system
- D. Whole organism

A. An organ is a structural and functional unit made of more than one tissue.

B. An organelle is a structure inside a cell, not a body part made of tissues.

C. An organ system is made of several organs, not of tissues directly.

D. A whole organism is made of organ systems, not directly of tissues.

Question 177 Biology

A method in which pests are destroyed by using same living organisms or natural enemies is called

- A. Pasteurization
- B. Integrated disease management
- C. Biological control ✓ **Correct answer**
- D. Genetic engineering

A. Pasteurization is heat treatment of milk to kill microbes, not pest control by living organisms.

B. Integrated disease management combines methods against disease, not specifically pest control by natural enemies.

C. Biological control uses living organisms or natural enemies to destroy pests.

D. Genetic engineering modifies genes, it is not pest control by natural enemies.

178 Biology

Chemicals produced by microorganisms which are capable of destroying the growth of microbes are called

- A. Antigen
- B. Biocidal
- C. Antiseptics
- D. Antibiotics ✓ **Correct answer**

A. An antigen stimulates antibody formation; it is not a chemical that destroys microbes.

B. "Biocidal" describes something that kills living organisms in general, not the specific chemicals produced by microorganisms.

C. Antiseptics are chemicals applied to living tissue to kill microbes; they are not necessarily produced by microorganisms.

D. Antibiotics are chemicals produced by microorganisms that inhibit or destroy other microbes.

Question 179 Biology

Plastids are only found in the

- A. Animals and Plants
- B. Animals
- C. Plants ✓ **Correct answer**
- D. Viruses

A. Plastids are not found in animals.

B. Plastids are not found in animals.

C. Plastids (chloroplasts, chromoplasts, leucoplasts) are found only in plant cells.

D. Viruses have no organelles, including plastids.

180 Biology

Plasma membrane is chemically composed of

- A. Phospholipids only
- B. Lipids and proteins ✓ **Correct answer**
- C. Lipids and carbohydrates
- D. Glycoproteins

A. The membrane also contains proteins, so it is not phospholipids only.

B. The plasma membrane is mainly composed of a lipid bilayer with embedded proteins.

C. Carbohydrates are present only in small amounts (as glycolipids/glycoproteins); the main components are lipids and proteins.

D. Glycoproteins are only a minor component of the membrane.

Question 181 Biology

Endoplasmic reticulum contains a system of flattened membrane-bounded sacs which are named as

- A. Cristae
- B. Marks
- C. Cisternae ✓ **Correct answer**
- D. Tubules

A. Cristae are the inner folds of mitochondria, not of the endoplasmic reticulum.

B. "Marks" is not a name for the sacs of the endoplasmic reticulum.

C. The flattened membrane-bounded sacs of the endoplasmic reticulum are called cisternae.

D. Tubules are a different (cylindrical) part of the endoplasmic reticulum, not the flattened sacs.

182 Biology

Lipids synthesis / metabolism takes place in which of the following organelle?

- A. Mitochondria
- B. Vacuoles
- C. Rough endoplasmic reticulum
- D. Smooth endoplasmic reticulum ✓ **Correct answer**

A. Mitochondria produce ATP; they are not the site of lipid synthesis.

B. Vacuoles store materials; they do not synthesise lipids.

C. The rough ER (with ribosomes) synthesises proteins, not lipids.

D. The smooth ER (without ribosomes) is the site of lipid synthesis and metabolism.

Question 183 Biology

Ribosomes exist in two forms, either attached with RER or freely dispersed in the

- A. Tonoplast
- B. Golgi bodies
- C. Cytoplasm ✓ **Correct answer**
- D. SER

A. The tonoplast is the membrane of a vacuole; ribosomes are not dispersed in it.

B. Ribosomes are not dispersed in Golgi bodies.

C. Free ribosomes are dispersed in the cytoplasm.

D. Ribosomes are not dispersed in the smooth endoplasmic reticulum.

Question 184 Biology

Exchange of segments between homologous chromosomes is called

regation

- B. Independent assortment
- C. Crossing over ✓ **Correct answer**
- D. Mutation

A. Segregation is the separation of homologous chromosomes in meiosis I, not the exchange of segments.

B. Independent assortment is the random orientation of chromosome pairs, not the exchange of segments.

C. Crossing over is the exchange of segments between non-sister chromatids of homologous chromosomes.

D. Mutation is a change in the DNA sequence, not the exchange of segments.

Question 185 Biology

If a person has 44 autosomes + XXY, he will suffer from

- A. Klinefelter's syndrome ✓ **Correct answer**
- B. Down's syndrome
- C. Turner's syndrome
- D. Edward's syndrome

A. A 47,XXY karyotype (44 autosomes + XXY) causes Klinefelter's syndrome in males.

B. Down's syndrome is trisomy 21 (47,XX/XY,+21), not 44 + XXY.

C. Turner's syndrome is 45,X (a female with one X chromosome).

D. Edward's syndrome is trisomy 18, not 44 + XXY.

Question 186 Biology

The ribosomal RNA is synthesized and stored in

oplasmic reticulum

- B. Nucleolus ✓ **Correct answer**
- C. Golgi complex
- D. Chromosomes

A. The endoplasmic reticulum does not synthesise or store ribosomal RNA.

B. Ribosomal RNA is synthesised and stored in the nucleolus, where ribosome subunits are assembled.

C. The Golgi complex modifies and packages proteins; it does not synthesise rRNA.

D. Chromosomes carry the rRNA genes, but rRNA is synthesised and stored in the nucleolus.

Question 187 Biology

In which stage of Interphase, there is increase in cell size and many biochemical are formed?

- A. G_2 phase
- B. G_1 phase ✓ **Correct answer**
- C. S phase
- D. C phase

A. In G_2 the cell prepares for division, but the main growth and biochemical synthesis occur in G_1.

B. In G_1 the cell grows in size and synthesises many biochemicals (proteins, RNA) before DNA replication.

C. In S phase DNA is replicated; it is not the main growth phase.

D. There is no "C phase" of interphase.

188 Biology

In Down's syndrome, which one of the following pair of chromosome fails to segregate?

- A. 7
- B. 18
- C. 21 ✓ **Correct answer**
- D. 19

A. Failure of chromosome 7 to segregate does not cause Down's syndrome.

B. Trisomy 18 causes Edward's syndrome, not Down's syndrome.

C. Down's syndrome is caused by trisomy 21: the pair of chromosome 21 fails to segregate (non-disjunction).

D. Failure of chromosome 19 to segregate does not cause Down's syndrome.

Question 189 Biology

Carbohydrates are organic molecules and contain three elements

- A. Carbon, water and oxygen
- B. Carbon, Sulphur and hydrogen
- C. Carbon, calcium and hydrogen
- D. Carbon, hydrogen and oxygen ✓ **Correct answer**

A. Water is a compound, not an element in carbohydrates.

B. Carbohydrates contain no sulphur.

C. Carbohydrates contain no calcium.

D. Carbohydrates are made of carbon, hydrogen and oxygen (general formula $C_x(H_2O)_y$).

190 Biology

Which one are intermediates in respiration and photosynthesis both?

- A. Ribose and heptolose
- B. Glyceraldehydes and dihydroxyacetone ✓ **Correct answer**
- C. Glucose and galactose
- D. Fructose and ribulose

A. Ribose and heptulose are not the shared intermediates of respiration and photosynthesis.

B. Glyceraldehyde-3-phosphate and dihydroxyacetone phosphate occur both in glycolysis (respiration) and in the Calvin cycle (photosynthesis).

C. Glucose is a product of photosynthesis and a substrate of respiration, but the pair is not the shared intermediate.

D. Fructose and ribulose are not the shared intermediates of both processes.

Question 191 Biology

Which of the following is a peptide bond?

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

A. A peptide bond is the –CO–NH– linkage between amino acids, a carbon–nitrogen bond.

B. A C–O bond is found in esters and ethers, not a peptide bond.

C. A C–P bond is not a peptide bond.

D. A C–S bond is not a peptide bond.

192 Biology

Which of the following is an unsaturated fatty acid?

- A. Acetic Acid
- B. Butyric acid
- C. Oleic acid ✓ **Correct answer**
- D. Palmitic acid

A. Acetic acid is a short saturated acid (CH_3COOH), not an unsaturated fatty acid.

B. Butyric acid is a saturated fatty acid.

C. Oleic acid (C18:1) has one double bond, so it is an unsaturated fatty acid.

D. Palmitic acid (C16:0) is a saturated fatty acid.

Question 193 Biology

Which of the following combination of base pair is absent in DNA?

- A. A–T
- B. C–G
- C. A–U ✓ **Correct answer**
- D. T–A

A. Adenine pairs with thymine in DNA, so A–T is present.

B. Cytosine pairs with guanine in DNA, so C–G is present.

C. Uracil is found in RNA, not DNA; the A–U pair is absent from DNA.

D. Thymine pairs with adenine in DNA, so T–A is present.

Question 194 Biology

The type of inhibition in which inhibitor has no structural similarity to substrate and

ith enzyme at other than the active site is called

- A. Irreversible inhibition
- B. Competitive inhibition
- C. Non-competitive and reversible inhibition ✓ **Correct answer**
- D. Reversible inhibition

A. Irreversible inhibitors bind permanently and destroy the enzyme; the description here is of reversible binding elsewhere on the enzyme.

B. Competitive inhibitors resemble the substrate and bind at the active site — the opposite of the description.

C. The inhibitor binds at a site other than the active site without resembling the substrate, and the binding is reversible — non-competitive reversible inhibition.

D. Reversible inhibition alone does not specify the binding site; the description is specifically non-competitive.

Question 195 Biology

The inhibitors that bind tightly and permanently to enzymes and destroy their globular structure and catalytic activity are

- A. Reversible inhibitors
- B. Irreversible inhibitors ✓ **Correct answer**
- C. Competitive inhibitors
- D. Non-competitive inhibitors

A. Reversible inhibitors bind loosely and can be removed; they do not destroy the enzyme.

B. Irreversible inhibitors bind tightly and permanently, destroying the enzyme's structure and activity.

C. Competitive inhibitors compete at the active site but bind reversibly.

petitive inhibitors bind elsewhere but reversibly; they do not permanently destroy the enzyme.

Question 196 Biology

Enzyme succinate dehydrogenase converts succinate into

- A. Malate
- B. Malonic acid
- C. Citrate
- D. Fumarate ✓ **Correct answer**

A. Succinate dehydrogenase does not produce malate; malate is formed from fumarate by fumarase.

B. Malonic acid is an inhibitor of succinate dehydrogenase, not its product.

C. Citrate is formed at the start of the Krebs cycle, not from succinate.

D. Succinate dehydrogenase oxidises succinate to fumarate, producing $FADH_2$.

Question 197 Biology

If the detachable co-factor is an inorganic ion then it is designated as

- A. Coenzyme
- B. Prosthetic group
- C. Holoenzyme
- D. Activator ✓ **Correct answer**

A. A coenzyme is an organic, non-protein co-factor, not an inorganic ion.

B. A prosthetic group is permanently attached to the enzyme, not detachable.

C. A holoenzyme is the complete enzyme with its co-factor, not the co-factor itself.

D. A detachable inorganic ion co-factor (such as Mg^{2+} or Zn^{2+}) is called an activator.

198 Biology

In HIV viruses, reverse transcriptase converts single-stranded RNA into double stranded viral DNA. This process is called

- A. Translation
- B. Duplication
- C. Replication
- D. Reverse Transcriptase ✓ **Correct answer**

A. Translation is the synthesis of protein from mRNA, not the conversion of RNA into DNA.

B. "Duplication" is not the name of this process.

C. Replication is the copying of DNA to DNA, not RNA to DNA.

D. The process is reverse transcription, carried out by the enzyme reverse transcriptase — the intended answer among the options as printed.

Question 199 Biology

Mesosomes are infoldings of the cell membrane and are involved in

- A. DNA replication ✓ **Correct answer**
- B. RNA synthesis
- C. Protein synthesis
- D. Metabolism

A. Mesosomes are involved in DNA replication and in the separation of daughter chromosomes during bacterial cell division.

B. RNA synthesis is carried out by RNA polymerase, not by mesosomes.

C. Protein synthesis is carried out by ribosomes, not by mesosomes.

D. Mesosomes are not generally described as the site of metabolism.

200 Biology

Most widespread problem of the antibiotics misuse is the

- A. Rapid cure
- B. Increased resistance in pathogen ✓ **Correct answer**
- C. Disturbance of metabolism
- D. Immunity

A. Rapid cure is a benefit of antibiotics, not a problem of their misuse.

B. Misuse of antibiotics selects for resistant pathogens — the most widespread problem.

C. Disturbance of metabolism is not the main widespread problem of antibiotic misuse.

D. Immunity is the body's own defence, not a problem caused by antibiotic misuse.

Question 201 Biology

Which of the following component is found in the cell wall of fungi?

- A. Cellulose
- B. Chitin ✓ **Correct answer**
- C. Proteins
- D. Glycerol

A. Cellulose is the main component of plant cell walls, not fungal walls.

B. The cell wall of fungi is made mainly of chitin.

C. Proteins are present in fungal walls but chitin is the characteristic component.

D. Glycerol is not a component of the fungal cell wall.

Question 202 Biology

The male reproductive parts of the flower are called

oecium

- B. Calyx
- C. Androecium ✓ **Correct answer**
- D. Corolla

A. The gynoecium is the female reproductive part of the flower.

B. The calyx is the whorl of sepals, not the male reproductive parts.

C. The androecium (stamens) is the male reproductive part of the flower.

D. The corolla is the whorl of petals, not the male reproductive parts.

Question 203 Biology

Fasciola is the name given to

- A. Tapeworm
- B. Planaria
- C. Liver fluke ✓ **Correct answer**
- D. Earthworm

A. The tapeworm is Taenia, not Fasciola.

B. Planaria is a free-living flatworm, not Fasciola.

C. Fasciola hepatica is the liver fluke.

D. The earthworm is Pheretima, not Fasciola.

Question 204 Biology

Ascaris is

- A. Diploplastic
- B. Triploblastic ✓ **Correct answer**
- C. Haploid

A. "Diploplastic" is not a term; Ascaris is triploblastic (three germ layers).

B. Ascaris develops from three germ layers (ectoderm, mesoderm, endoderm), so it is triploblastic.

C. Haploid refers to chromosome number, not to the body plan of Ascaris.

D. Ascaris is a pseudocoelomate, not an acoelomate.

Question 205 Biology

During development, in an animal, mesoderm layer gives rise to

- A. Nervous System
- B. Alimentary canal lining
- C. Muscular and skeletal system ✓ **Correct answer**
- D. Mouth

A. The nervous system develops from ectoderm, not mesoderm.

B. The lining of the alimentary canal develops from endoderm, not mesoderm.

C. The mesoderm gives rise to muscles, skeleton, blood and connective tissue.

D. The mouth develops from ectoderm/endoderm, not from mesoderm.

Question 206 Biology

Polymorphism is characteristic feature of

- A. Porifera
- B. Cnidaria ✓ **Correct answer**
- C. Annelida
- D. Nematodes

sponges) are not characterised by polymorphism.

B. Cnidarians show polymorphism, with polyp and medusa forms (e.g. Obelia).

C. Annelids are not characterised by polymorphism.

D. Nematodes are not characterised by polymorphism.

Question 207 Biology

The muscles of the stomach walls thoroughly mix up the food with gastric juices and the resulting semi-solid / semi-liquid material is called

- A. Bolus
- B. Bolus or chime
- C. Mucus
- D. Chyme ✓ **Correct answer**

A. A bolus is the ball of chewed food in the mouth and oesophagus, not the stomach contents.

B. "Chime" is a misspelling; the stomach product is chyme, not a bolus.

C. Mucus is the protective secretion of the stomach lining, not the mixed food.

D. The semi-solid, semi-liquid mixture of food and gastric juice in the stomach is chyme.

Question 208 Biology

Trypsinogen is converted into trypsin by the activity of

- A. Goblet cells
- B. Absorptive cells
- C. Enterokinase ✓ **Correct answer**
- D. Peptidase

A. Goblet cells secrete mucus, not the enzyme that activates trypsinogen.

e cells absorb nutrients, they do not convert trypsinogen into trypsin.

C. Enterokinase (enteropeptidase) converts trypsinogen into trypsin in the small intestine.

D. Peptidases digest peptides; they do not activate trypsinogen.

Question 209 Biology

In large intestines, vitamin K is formed by the activity of

- A. Symbiotic bacteria ✓ **Correct answer**
- B. Obligate parasite
- C. Parasitic bacteria
- D. Facultative bacteria

A. Vitamin K is synthesised in the large intestine by symbiotic gut bacteria (e.g. E. coli).

B. Obligate parasites do not produce vitamin K in the gut.

C. Parasitic bacteria harm the host; vitamin K is made by symbiotic bacteria.

D. The vitamin-K producers are the symbiotic gut bacteria, not facultative bacteria as a class.

Question 210 Biology

Goblet cells secrete

- A. HCl
- B. Mucus ✓ **Correct answer**
- C. Enzymes
- D. Amylase

A. HCl is secreted by parietal cells of the stomach, not by goblet cells.

B. Goblet cells secrete mucus, which lubricates and protects the gut lining.

ls do not secrete digestive enzymes.

D. Amylase is secreted by salivary glands and the pancreas, not by goblet cells.

Question 211 Biology

Mature mammalian red blood cells do not have

- A. Nucleus ✓ **Correct answer**
- B. Red color
- C. Fluids
- D. Haemoglobin

A. Mature mammalian red blood cells lose their nucleus, leaving more room for haemoglobin.

B. Red blood cells do have their red colour, from haemoglobin.

C. Red blood cells contain cytoplasmic fluid.

D. Red blood cells are packed with haemoglobin.

Question 212 Biology

In a normal person plasma constitutes about _____ by volume of blood

- A. 50%
- B. 60%
- C. 45%
- D. 55% ✓ **Correct answer**

A. Plasma is about 55%, not 50%, of blood volume.

B. Plasma is about 55%, not 60%, of blood volume.

C. About 45% of blood volume is cells, not plasma.

nstitutes about 55% of blood volume in a normal person.

Question 213 Biology

Which vein has oxygenated blood?

- A. Renal vein
- B. Subclavian vein
- C. Pulmonary vein ✓ **Correct answer**
- D. Jugular vein

A. The renal vein carries deoxygenated blood from the kidney to the vena cava.

B. The subclavian vein carries deoxygenated blood from the arm.

C. The pulmonary vein carries oxygenated blood from the lungs to the left atrium. (Note: the paper misprints this option's label as "(B)" — the options above are in positional order.)

D. The jugular vein carries deoxygenated blood from the head.

Question 214 Biology

What is the residual volume of air which always remains inside the lungs of human?

- A. 3.5 Liters
- B. 0.5 Liters
- C. 5.0 Liters
- D. 1.5 Liters ✓ **Correct answer**

A. 3.5 litres is not the residual volume; the residual volume is about 1.5 litres.

B. 0.5 litres is the tidal volume, not the residual volume.

C. 5.0 litres is not the residual volume.

D. The residual volume the air that always remains in the lungs after maximum

- is about 1.3 litres.

Question 215 Biology

In nephron, most of the reabsorption takes place in the

- A. Distal tubule
- B. Proximal tubule ✓ **Correct answer**
- C. Ascending limb
- D. Descending limb

A. Some reabsorption occurs in the distal tubule, but most takes place in the proximal tubule.

B. Most reabsorption (about 65–70% of the filtrate) takes place in the proximal convoluted tubule.

C. The ascending limb reabsorbs salts but not most of the filtrate.

D. The descending limb reabsorbs water, but most reabsorption occurs in the proximal tubule.

Question 216 Biology

Detection of change and signaling for effector's response to the control system is a

- A. Negative feedback
- B. Positive feedback
- C. Inter-coordination
- D. Feedback mechanism ✓ **Correct answer**

A. Negative feedback is a type of feedback that reverses a change; the detection-and-signalling loop as a whole is the feedback mechanism.

B. Positive feedback amplifies a change; the detection-and-signalling loop as a whole is the feedback mechanism.

dilation is not the name of this detection-and-signalling loop.

D. Detection of a change and signalling the effector to respond is the feedback mechanism of homeostatic control.

Question 217 Biology

What are three components of mechanism of homeostatic regulations?

- A. Receptors, control centre and effectors ✓ **Correct answer**
- B. Sensory, motor and associative neurons
- C. CNS, PNS and diffused nervous system
- D. Cerebrum, cerebellum and pons

A. The three components are the receptor (detects change), the control centre (decides the response) and the effector (carries it out).

B. These are types of neurons, not the three components of homeostatic regulation.

C. These are divisions of the nervous system, not the three components of homeostatic regulation.

D. These are parts of the brain, not the three components of homeostatic regulation.

Question 218 Biology

Blood enters the glomerulus through

- A. Efferent arteriole
- B. Afferent arteriole ✓ **Correct answer**
- C. Renal artery
- D. Renal vein

A. Blood leaves the glomerulus through the efferent arteriole.

B. Blood enters the glomerulus through the afferent arteriole.

artery supplies the kidney, but blood enters the glomerulus itself through the afferent arteriole.

D. The renal vein carries blood away from the kidney, not into the glomerulus.

Question 219 Biology

Which portion of nephron is under the control of ADH?

- A. Bowman's capsule
- B. Ascending arm
- C. Distal and collecting ducts ✓ **Correct answer**
- D. Descending arm

A. Bowman's capsule is the site of filtration, not ADH control.

B. The ascending limb is impermeable to water and not under ADH control.

C. ADH (vasopressin) increases water reabsorption in the distal convoluted tubule and the collecting ducts.

D. The descending limb is permeable to water but is not under ADH control.

Question 220 Biology

Cause of Parkinson's disease is death of brain cells that produce

- A. Dopamine ✓ **Correct answer**
- B. Acetylcholine
- C. ADH hormone
- D. Oxytocin

A. Parkinson's disease is caused by the death of dopamine-producing neurons in the substantia nigra.

B. Acetylcholine is not the neurotransmitter whose loss causes Parkinson's disease.

pressin) is not involved in Parkinson's disease.

D. Oxytocin is not involved in Parkinson's disease.

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