MDCAT (SZABMU entry test, Paper Code C) — 2023 · Solved Past Paper

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> **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 2023 sitting.

Source note: Google Drive scan of SZABMU MDCAT 2023, Paper Code C (6,794,314 B, 24 pp., CamScanner, titled 'MDCAT 2023-24'; Drive id 19KlVTD6PzaYA2cf7JZHRIhRMfb1QAjOa), read visually from 300 dpi page renders, accessed 11 Nov 2026. Answer key: the official SZABMU 2023 answer key (result.pk mirror of the official key, 5 pp.), Code C only; key balance A49/B60/C55/D36. 200 MCQs: Physics 54 / Biology 68 / Chemistry 54 / English 18 / Logical Reasoning 6. 2 printed-key corrections (Q19, Q37); 2 PICK-ONE (Q21, Q38); 1 DEFECTIVE-excluded (Q88). Answers verified independently against reference facts, worked derivations and targeted sources, never from the printed key alone. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

Question 1 The relative permittivity of air (1

The relative permittivity of air (1 atm) is:

- A. 1
- B. 1.0006 ✓ **Correct answer**
- C. 22-25

A. wrong: air is not a vacuum; its relative permittivity is very slightly above 1, not exactly 1.

B. correct: the relative permittivity (dielectric constant) of air at 1 atm is about 1.0006.

C. wrong: 22-25 is far too large; no common gas has a relative permittivity in this range.

D. wrong: 2.284 is not the value for air; it is closer to values for some liquids.

Question 2 Equivalent capacitance is less than least

Equivalent capacitance is less than least value of capacitance in a combination in:

- A. Series ✓ **Correct answer**
- B. Parallel
- C. Closed circuit
- D. Open circuit

A. correct: in series 1/C = 1/C1 + 1/C2 + ..., so the equivalent capacitance is smaller than the smallest single capacitance.

B. wrong: in parallel the capacitances add, so the equivalent is larger than any single one.

C. wrong: a closed circuit is not a capacitor combination.

D. wrong: an open circuit is not a capacitor combination.

Question 3 The magnitude of the force between

The magnitude of the force between two point charges is directly proportional to:

- A. Distance between point charges
- B. Square of distance between point charges
- C. Cube of distance between point charges
- D. Product of magnitude of charges ✓ **Correct answer**

e force falls as distance increases; it is not directly proportional to distance.

B. wrong: the force is inversely proportional to the square of the distance, not directly proportional to it.

C. wrong: the force does not depend on the cube of the distance.

D. correct: by Coulomb's law $F = kq1q2/r^2$, so at fixed distance F is directly proportional to the product of the charges.

Question 4 When dielectric is placed between the

When dielectric is placed between the plates of a capacitor then capacitance will:

- A. Decrease
- B. Increase ✓ **Correct answer**
- C. Becomes half
- D. Remains same

A. wrong: inserting a dielectric increases the capacitance (C = kC0).

B. correct: the dielectric increases the capacitance by the dielectric constant k.

C. wrong: the capacitance increases, it does not halve.

D. wrong: the capacitance changes; it does not remain the same.

Question 5 A charge of 90 C passes

A charge of 90 C passes through a wire for 30 seconds. Then the current in the wire will be:

- A. 3 A ✓ **Correct answer**
- B. 0.3 A
- C. 3 mA
- D. 0.3 mA

= Q/t = 90/30 = 3 A.

B. wrong: 0.3 A would be 9 C in 30 s, not 90 C.

C. wrong: 3 mA is a thousand times too small.

D. wrong: 0.3 mA is ten thousand times too small.

Question 6 The magnitude of the current in

The magnitude of the current in metals is proportional to the applied voltage as long as temperature of conductor is kept constant. It is statement of:

- A. Joule's Law
- B. Gauss Law
- C. Ohm's Law ✓ **Correct answer**
- D. Ampere's Law

A. wrong: Joule's law concerns the heat produced by a current, not the proportionality of current and voltage.

B. wrong: Gauss's law concerns electric flux through a closed surface.

C. correct: V = IR, current proportional to voltage at constant temperature, is Ohm's law.

D. wrong: Ampere's law concerns the magnetic field around a current.

Question 7 When length of copper wire is

When length of copper wire is doubled then resistivity becomes:

- A. Double
- B. Half
- C. Remains same ✓ **Correct answer**
- D. Four times

A. wrong: resistivity is a property of the material, not of the wire's length.

sistivity does not halve when the length doubles.

C. correct: resistivity depends only on the material and temperature, not on length; the resistance doubles, the resistivity stays the same.

D. wrong: resistivity does not become four times; it is independent of length.

Question 8 The resistance of semi-conductor with rise

The resistance of semi-conductor with rise in temperature:

- A. Increases
- B. Decreases ✓ **Correct answer**
- C. Remain same
- D. Infinite

A. wrong: in a semiconductor more charge carriers are freed as temperature rises, so resistance falls.

B. correct: the resistance of a semiconductor decreases with rising temperature (negative temperature coefficient).

C. wrong: the resistance changes with temperature; it does not remain the same.

D. wrong: the resistance decreases, it does not become infinite.

Question 9 A heating coil has a resistance

A heating coil has a resistance of 10 ohm. It is designed to operate on 20V. What electric energy is supplied to heater in 10s?

- A. 100J
- B. 200J
- C. 300J
- D. 400J ✓ **Correct answer**

t/R = 400 × 10/10 = 400 J, not 100 J.

B. wrong: the energy is 400 J, not 200 J.

C. wrong: the energy is 400 J, not 300 J.

D. correct: $E = V^2t/R = (20)^2 \times 10/10 = 400$ J.

Question 10 The unit of resistivity is

The unit of resistivity is:

- A. ohm
- B. ohm meter ✓ **Correct answer**
- C. ohm / meter
- D. meter / ohm

A. wrong: ohm is the unit of resistance, not resistivity.

B. correct: resistivity $\rho = RA/l$, so its unit is ohm metre.

C. wrong: ohm per metre is not the unit of resistivity.

D. wrong: metre per ohm is not the unit of resistivity.

Question 11 The unit of magnetic flux is

The unit of magnetic flux is:

- A. Weber (Wb) ✓ **Correct answer**
- B. Wbm
- C. Wbm-1
- D. Wbm-2

A. correct: the weber (Wb) is the SI unit of magnetic flux.

B. wrong: Wb m is not the unit of flux; flux is B times area, giving Wb.

D. wrong: Wb m-2 is the unit of magnetic flux density, not flux.

Question 12 Magnetic flux is the dot product

Magnetic flux is the dot product of:

- A. Magnetic field and scalar area
- B. Magnetic field and vector area ✓ **Correct answer**
- C. Magnetic field per unit scalar area
- D. Magnetic field per unit vector area

A. wrong: area in the flux definition is a vector quantity, not a scalar.

B. correct: magnetic flux Φ = B·A, the dot product of the magnetic field and the vector area.

C. wrong: flux is the field times area, not the field per unit area.

D. wrong: flux is the field times area, not the field per unit area.

Question 13 The dimension of magnetic field is

The dimension of magnetic field is same as that of:

- A. Magnetic flux density ✓ **Correct answer**
- B. Magnetic flux
- C. Magnetic force
- D. Work done

A. correct: magnetic field B is itself the magnetic flux density, so its dimension is the same.

B. wrong: magnetic flux has a different dimension (it includes an area factor).

C. wrong: magnetic force has the dimension of force, not of flux density.

ork done has the dimension of energy, not of flux density.

Question 14 At what angle the curved path

At what angle the curved path should be banked if a car is moving with a speed of 12 m/s at a radius 36m?

- A. 10 degrees
- B. 15 degrees
- C. 20 degrees
- D. 22 degrees ✓ **Correct answer**

A. wrong: tan θ = v^2/rg = 144/(36 × 10) = 0.4, giving θ ≈ 22°, not 10°.

B. wrong: tan θ = 0.4 gives θ ≈ 22°, not 15°.

C. wrong: tan θ = 0.4 gives θ ≈ 22°, not 20°.

D. correct: tan θ = v^2/rg = 144/360 = 0.4, so θ = tan-1(0.4) ≈ 22°.

Question 15 A wave generator produces 500 pulses

A wave generator produces 500 pulses in 50s. Its frequency will be:

- A. 10 s-1 ✓ **Correct answer**
- B. 0.1 s-1
- C. 500 s-1
- D. 50 s-1

A. correct: frequency = pulses/time = 500/50 = 10 s-1.

B. wrong: 0.1 s-1 would be 50/500, the inverse of the correct ratio.

C. wrong: 500 s-1 ignores the 50 s time interval.

D. wrong: 50 s-1 is the time interval, not the frequency.

16 Amplitude in the following figure is

Amplitude in the following figure is given as: [X (m) vs t (s) graph; peak displacement marked 1 m; horizontal extent 2 m]

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

A. wrong: 2 m is the horizontal extent marked on the graph, not the peak displacement.

B. wrong: the peak displacement marked on the graph is 1 m, not 1/2 m.

C. wrong: the peak displacement marked on the graph is 1 m, not 1/4 m.

D. correct: amplitude is the maximum displacement from the mean position, marked as 1 m on the X axis.

Note: Note: The figure plots displacement X (m) against time t (s) with the peak marked 1 m; the "2 m" label is the horizontal extent of the graph, not the amplitude.

Question 17 Which is the correct 'ascending order'

Which is the correct 'ascending order' in which the following photons are arranged according to their energy?

- A. Microwaves, Ultraviolet rays, Gamma rays ✓ **Correct answer**
- B. Gamma rays, Ultraviolet rays, Microwaves
- C. Gamma rays, Microwaves, Ultraviolet rays
- D. Ultraviolet rays, Gamma rays, Microwaves

A. correct: photon energy rises with frequency, so ascending energy is microwaves, then ultraviolet, then gamma rays.

B. wrong: this is descending order, not ascending.

mma rays have the highest energy of the three, so they cannot come first in ascending order.

D. wrong: microwaves have the lowest energy, so they cannot come last in ascending order.

Note: Note: The word "arranged" is cut at the right page edge in the scan ("arra...") and is restored.

Question 18 The Speed of sound in air

The Speed of sound in air is 332 ms-1 at 0 degrees C. What will be its value at 10 degrees C?

- A. 332 ms-1
- B. 338.1 ms-1 ✓ **Correct answer**
- C. 332.61 ms-1
- D. 334.1 ms-1

A. wrong: the speed of sound rises with temperature, so it cannot stay at 332 m/s at 10°C.

B. correct: v ≈ 332 + 0.61 × 10 ≈ 338 m/s, and the listed value 338.1 m/s is the textbook value.

C. wrong: 332.61 m/s is too small an increase for a 10°C rise.

D. wrong: 334.1 m/s is too small an increase for a 10°C rise.

Question 19 The number of revolutions per second

The number of revolutions per second of a body is known as:

- A. Linear frequency ✓ **Correct answer**
- B. Angular frequency
- C. Time period
- D. Amplitude

...e number of revolutions per second is the (linear) frequency f. (PRINTED-KEY ERROR CORRECTED: the printed key records B, but angular frequency is measured in radians per second.)

B. wrong: angular frequency ω = 2πf is measured in radians per second, not revolutions per second.

C. wrong: the time period is the time for one revolution, the inverse of the frequency.

D. wrong: amplitude is the maximum displacement, not a rate of revolution.

Question 20 Which of the following factors does

Which of the following factors does not affect the speed of sound in air?

- A. Density of gas
- B. Moisture in air
- C. Temperature
- D. Pressure of gas ✓ **Correct answer**

A. wrong: the speed of sound depends on the density of the gas ($v = \sqrt{(\gamma P/\rho)}$).

B. wrong: moisture changes the density of air and so affects the speed of sound.

C. wrong: the speed of sound rises with temperature.

D. correct: at constant temperature the speed of sound in a gas is independent of pressure.

Question 21 Time period of a vibrating body

Time period of a vibrating body is independent of:

- A. Frequency
- B. Amplitude ✓ **Correct answer**
- C. Wavelength

A. wrong: the period depends on frequency (T = 1/f), so it is not independent of frequency.

B. correct: for a vibrating body in simple harmonic motion the period is independent of the amplitude.

C. wrong: the period depends on wavelength (T = λ/v at fixed wave speed), so it is not independent of wavelength.

D. wrong: for a pendulum the period depends on g (T = 2π√(l/g)), so it is not independent of g.

Question 22 The relation between Cp and Cv

The relation between Cp and Cv is given as:

- A. Cp - Cv = R ✓ **Correct answer**
- B. Cp + Cv = R
- C. Cv - Cp = R
- D. R - Cv = Cp

A. correct: Cp − Cv = R (Mayer's relation) for an ideal gas.

B. wrong: Cp + Cv = R is not the relation; the difference, not the sum, equals R.

C. wrong: Cv − Cp = R has the wrong sign, since Cp is larger than Cv.

D. wrong: R − Cv = Cp is not the relation; Cp − Cv = R.

Question 23 The equation of 1st Law of

The equation of 1st Law of thermodynamics is:

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

A. correct: the first law is Q = ΔU + W (heat supplied equals the increase in internal energy plus the work done).

B. wrong: the correct form is ΔU = Q − W (work done by the system), so B has the wrong sign.

C. wrong: W = Q + ΔU rearranges the first law incorrectly.

D. wrong: Q = W holds only for an isothermal change of an ideal gas, not in general.

Question 24 The thermodynamics process during which the

The thermodynamics process during which the pressure is kept constant is called:

- A. Isochoric process
- B. Adiabatic process
- C. Isobaric process ✓ **Correct answer**
- D. Isothermal process

A. wrong: an isochoric process keeps volume constant, not pressure.

B. wrong: an adiabatic process has no heat exchange; pressure is not the constant quantity.

C. correct: an isobaric process is one carried out at constant pressure.

D. wrong: an isothermal process keeps temperature constant, not pressure.

Question 25 A one micro fared capacitor of

A one micro fared capacitor of a TV is subjected to 4000 V potential difference. The energy stored in capacitor is:

- A. 16 J
- B. 4x10-3 J

- D. 8 J ✓ **Correct answer**

A. wrong: 1/2 × 10-6 × $(4000)^2$ = 8 J, not 16 J.

B. wrong: 4 × 10-3 J is far too small; the stored energy is 8 J.

C. wrong: 2 × 10-3 J is far too small; the stored energy is 8 J.

D. correct: E = 1/2 CV^2 = 0.5 × 10-6 × 16 × 10^6 = 8 J.

Note: Note: The stem prints "one micro fared" (misprint for "one microfarad").

Question 26 A particle carrying a charge 2

A particle carrying a charge 2 e falls through a P.D of 3 V. The energy acquired by it will be:

- A. 6 ev ✓ **Correct answer**
- B. 7ev
- C. 1.5 ev
- D. 5 ev

A. correct: energy gained = charge × potential difference = 2e × 3 V = 6 eV.

B. wrong: 7 eV is not 2 × 3 eV.

C. wrong: 1.5 eV is the energy for a 0.75 V drop, not 3 V.

D. wrong: 5 eV is not 2 × 3 eV.

Question 27 Due to polarization process of dielectric

Due to polarization process of dielectric, the electric intensity:

- A. Increases
- B. Decreases ✓ **Correct answer**

- D. Becomes zero

A. wrong: polarization sets up an opposing field inside the dielectric, so the net field falls, not rises.

B. correct: the induced polarization field opposes the applied field, reducing the net electric intensity inside the dielectric.

C. wrong: the net field changes; it does not remain the same.

D. wrong: the field is reduced, not reduced to zero.

Question 28 The phenomenon in which a changing

The phenomenon in which a changing current in one coil induces an emf in another coil is:

- A. Self-induction
- B. Mutual induction ✓ **Correct answer**
- C. Eddy current
- D. Choke

A. wrong: self-induction is the emf induced in the same coil by its own changing current.

B. correct: an emf induced in one coil by a changing current in another coil is mutual induction.

C. wrong: eddy currents are circulating currents induced inside a bulk conductor, not an emf in a second coil.

D. wrong: a choke is a coil used to block alternating current, not the phenomenon itself.

Question 29 The induced current will flow in

The induced current will flow in such a direction so as to oppose the cause that produces

statement of:

- A. Ampere's Law
- B. Faraday's Law
- C. Lenz's Law ✓ **Correct answer**
- D. Joule's Law

A. wrong: Ampere's law relates the magnetic field around a current to the current.

B. wrong: Faraday's law gives the magnitude of the induced emf, not its direction.

C. correct: Lenz's law states that the induced current opposes the change that produces it.

D. wrong: Joule's law concerns the heat produced by a current.

Question 30 The transformer depends on the use

The transformer depends on the use of:

- A. Direct current
- B. Alternating current ✓ **Correct answer**
- C. Direct and alternating current
- D. Direct and alternating voltage

A. wrong: a transformer needs a changing flux, which direct current cannot provide.

B. correct: a transformer works on alternating current, whose changing flux induces an emf in the secondary.

C. wrong: direct current cannot operate a transformer.

D. wrong: direct current cannot operate a transformer.

Question 31 The domestic electricity supply in Pakistan

The domestic electricity supply in Pakistan has a frequency of:

Hz

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

A. wrong: 150 Hz is not the Pakistani mains frequency.

B. wrong: 100 Hz is not the Pakistani mains frequency.

C. correct: the domestic supply in Pakistan is 50 Hz.

D. wrong: 25 Hz is not the Pakistani mains frequency.

Question 32 Transformer works on the principle of

Transformer works on the principle of:

- A. Half wave rectification
- B. Self induction
- C. Mutual induction ✓ **Correct answer**
- D. Full wave rectification

A. wrong: rectification converts AC to DC; a transformer changes voltage levels.

B. wrong: self induction is the effect within one coil, not the principle of a transformer.

C. correct: a transformer transfers energy between coils by mutual induction.

D. wrong: rectification converts AC to DC; a transformer changes voltage levels.

Question 33 The conversion of A.C into D.C

The conversion of A.C into D.C is called rectification and circuit is called rectifier. Which component of electronics acts as a rectifier?

- A. Diode ✓ **Correct answer**
- B. Transistor

- D. Inductor

A. correct: a diode conducts in one direction only, so it rectifies alternating current.

B. wrong: a transistor amplifies or switches; it is not the rectifier component.

C. wrong: a transformer changes AC voltage; it does not rectify.

D. wrong: an inductor opposes changes in current; it does not rectify.

Question 34 The wavelength associated with an electron

The wavelength associated with an electron is of the order of:

- A. Visible light
- B. X-rays ✓ **Correct answer**
- C. Radio waves
- D. Infrared

A. wrong: the electron wavelength (about 10-10 m) is far shorter than visible light.

B. correct: the de Broglie wavelength of an electron is of the order of 10-10 m, the X-ray range.

C. wrong: radio waves are metres to kilometres long, far longer than the electron wavelength.

D. wrong: infrared is about 10-6 m, far longer than the electron wavelength.

Question 35 Red light is used in photographic

Red light is used in photographic dark room because of:

- A. High frequency, short wavelength
- B. Low frequency, short wavelength
- C. Low frequency, long wavelength ✓ **Correct answer**

h frequency, long wavelength

A. wrong: red light has low frequency and long wavelength, not high frequency.

B. wrong: red light has long wavelength, not short.

C. correct: red light has low frequency and long wavelength, so it does not expose photographic film.

D. wrong: red light has low frequency, not high frequency.

Question 36 Which photons carries the most energy?

Which photons carries the most energy?

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

A. wrong: blue light carries less energy than violet light.

B. correct: violet has the highest frequency of the four, and photon energy E = hf rises with frequency.

C. wrong: red light has the lowest frequency of the four, so it carries the least energy.

D. wrong: green light carries less energy than violet light.

Question 37 Which X-ray photon will have longest

Which X-ray photon will have longest wavelength?

- A. Kα
- B. Kβ
- C. Kγ
- D. Mα ✓ **Correct answer**

alpha is the L-to-K transition, high energy and short wavelength. (PRINTED-KEY ERROR CORRECTED: the printed key records A, but M-alpha has far lower energy than any K line.)

B. wrong: K-beta is a K-shell transition, high energy and short wavelength.

C. wrong: K-gamma is a K-shell transition, high energy and short wavelength.

D. correct: M-alpha is the N-to-M shell transition, the lowest-energy line of the four, so it has the longest wavelength (λ = hc/E).

Question 38 Which of following series lies in

Which of following series lies in infra-red region?

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

A. wrong: Lyman lies in the ultra-violet and Balmer in the visible region.

B. wrong: Balmer lies in the visible region, not the infra-red.

C. correct: Paschen (n=3) and Brackett (n=4) series both lie in the infra-red region. (D is also correct, see the PICK-ONE note.)

D. also correct: Brackett (n=4) and Pfund (n=5) series both lie in the infra-red region, so D is also a correct pair; the key records C, which is filed.

Question 39 The unit of radio activity is

The unit of radio activity is curie which is equal to:

- A. 7.3 x 10^10 disintegration / s
- B. 3.7 x 10^10 disintegration / s ✓ **Correct answer**

- D. 7.3 disintegration / s

A. wrong: 1 curie is 3.7 × 10^10 disintegrations per second, not 7.3 × 10^10.

B. correct: 1 curie = 3.7 × 10^10 disintegrations per second.

C. wrong: 3.7 disintegrations per second is far too small.

D. wrong: 7.3 disintegrations per second is far too small.

Question 40 The rate of radioactive decay is

The rate of radioactive decay is directly proportional to the stability of the:

- A. Medium
- B. Atmosphere
- C. Isotopes ✓ **Correct answer**
- D. Half life

A. wrong: the decay rate does not depend on the medium.

B. wrong: the decay rate does not depend on the atmosphere.

C. correct: the decay constant is a property of the isotope itself (the wording is loose, see the note).

D. wrong: half-life is inversely related to the decay rate, not directly proportional to it.

Note: Note: The wording is loose: the decay rate is not proportional to stability (a more stable isotope decays more slowly). C is filed because the decay constant is a property of the isotope itself; half-life is inversely related to the rate, and the medium and atmosphere do not affect it.

41 Skin burn, loss of hair, drop

Skin burn, loss of hair, drop in white blood cell and induction of cancer are example of _____ of radiation:

- A. Zener effect
- B. Genetic effect
- C. Somatic effect ✓ **Correct answer**
- D. Biological effect

A. wrong: the Zener effect concerns the breakdown of a semiconductor junction, not radiation injury.

B. wrong: genetic effects are passed to offspring; skin burns and hair loss are effects on the exposed person.

C. correct: skin burns, hair loss, a fall in white blood cells and cancer induction are somatic effects, effects on the exposed individual's body.

D. wrong: biological effect is too general; the specific term for effects on the exposed person is somatic effect.

Question 42 The car is speeding up along

The car is speeding up along negative y axis then acceleration will be along:

- A. Positive x Axis
- B. Negative x Axis
- C. Positive y Axis
- D. Negative y Axis ✓ **Correct answer**

A. wrong: the acceleration is along the direction of the velocity change, the negative y axis.

B. wrong: the acceleration is along the negative y axis, not the negative x axis.

C. wrong: the car speeds up along the negative y axis, so the acceleration is in the

reection.

D. correct: speeding up means the acceleration is in the same direction as the velocity, the negative y axis.

Question 43 Momentum is product of mass and

Momentum is product of mass and velocity, then momentum and velocity are:

- A. Parallel ✓ **Correct answer**
- B. Perpendicular
- C. Antiparallel
- D. Independent

A. correct: momentum p = mv is a vector in the same direction as the velocity, so the two are parallel.

B. wrong: momentum and velocity point in the same direction, not at right angles.

C. wrong: momentum and velocity point in the same direction, not opposite directions.

D. wrong: momentum depends directly on velocity; the two are not independent.

Question 44 Which of the pair of two

Which of the pair of two projectiles projected at different angles have same ranges?

- A. (30 degrees, 70 degrees)
- B. (40 degrees, 50 degrees) ✓ **Correct answer**
- C. (35 degrees, 40 degrees)
- D. (45 degrees, 40 degrees)

A. wrong: complementary angles (summing to 90°) give equal ranges; 30° and 70° sum to 100°.

B. correct: 40° and 50° are complementary (sum 90°), so sin 2θ is the same for both and

re equal.

C. wrong: 35° and 40° are not complementary, so their ranges differ.

D. wrong: 45° and 40° are not complementary, so their ranges differ.

Question 45 The slope of velocity-time graph gives

The slope of velocity-time graph gives us:

- A. Speed
- B. Velocity
- C. Acceleration ✓ **Correct answer**
- D. Distance

A. wrong: the slope of a velocity-time graph is the rate of change of velocity, which is acceleration.

B. wrong: the slope gives acceleration, not the velocity itself.

C. correct: slope = Δv/Δt = acceleration.

D. wrong: the area under a velocity-time graph gives distance, not the slope.

Question 46 The time rate of change of

The time rate of change of linear momentum of a body is equal to:

- A. Force ✓ **Correct answer**
- B. Momentum
- C. Power
- D. Acceleration

A. correct: by Newton's second law, F = dp/dt, the time rate of change of linear momentum is the force.

B. wrong: the rate of change of momentum is the force, not the momentum itself.

wer is the rate of doing work, not the rate of change of momentum.

D. wrong: acceleration is the rate of change of velocity, not of momentum.

Question 47 At what angle of projection of

At what angle of projection of a projectile the range becomes half of its maximum value?

- A. 15 degrees ✓ **Correct answer**
- B. 20 degrees
- C. 30 degrees
- D. 40 degrees

A. correct: $R = (v^2/g) \sin 2\theta$; R is half its maximum when $\sin 2\theta = 1/2$, so $2\theta = 30°$, $\theta = 15°$.

B. wrong: at 20°, sin 40° is not 1/2, so the range is not half the maximum.

C. wrong: at 30°, sin 60° is not 1/2, so the range is not half the maximum.

D. wrong: at 40°, sin 80° is not 1/2, so the range is not half the maximum.

Question 48 According to work energy principle in

According to work energy principle in linear motion, the work done on the body is equal to:

- A. Change in P. E
- B. Sum of P. E + K. E
- C. Change in K. E ✓ **Correct answer**
- D. Zero

A. wrong: the work-energy principle equates work done to the change in kinetic energy, not potential energy.

B. wrong: work done equals the change in kinetic energy only, not the sum of the two energies.

e work-energy principle states that the work done on a body equals the change in its kinetic energy.

D. wrong: the work done is the change in kinetic energy, not zero.

Question 49 If a body of mass 'm'

If a body of mass 'm' is accelerated on a smooth horizontal surface 'S' by a force 'F'. The work done F x S is converted into:

- A. Heat energy
- B. Kinetic energy ✓ **Correct answer**
- C. Potential energy
- D. Electromagnetic energy

A. wrong: on a smooth surface no work is lost as heat; it becomes kinetic energy.

B. correct: the work done by the force increases the body's kinetic energy.

C. wrong: the surface is horizontal, so no gravitational potential energy is gained.

D. wrong: the work is converted to kinetic energy, not electromagnetic energy.

Question 50 One megawatt hour is equal to

One megawatt hour is equal to:

- A. 3.6 x 10^6J
- B. 3.6 x 10^9J ✓ **Correct answer**
- C. 3.6 MJ
- D. 3.6 nJ

A. wrong: 1 MWh = 10^6 W × 3600 s = 3.6 × 10^9 J, not 3.6 × 10^6 J.

B. correct: 1 megawatt hour = 10^6 × 3600 = 3.6 × 10^9 J.

C. wrong: 3.6 MJ is 3.6 × 10^6 J, a thousand times too small.

5 nJ is far too small.

Question 51 A motor boat is moving with

A motor boat is moving with velocity 4 ms-1. The net force acting on it is 4000 N. What will be the power of the engine of boat?

- A. 1000 W
- B. 160 W
- C. 16 KW ✓ **Correct answer**
- D. 1600 W

A. wrong: P = Fv = 4000 × 4 = 16000 W, not 1000 W.

B. wrong: 160 W is far too small; P = Fv = 16000 W.

C. correct: P = Fv = 4000 N × 4 m/s = 16000 W = 16 kW.

D. wrong: 1600 W is ten times too small.

Question 52 In angular motion, in one rotation

In angular motion, in one rotation there are:

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

A. wrong: one rotation is 2π radians, not π.

B. correct: one complete rotation subtends 2π radians.

C. wrong: π/2 radians is a quarter rotation.

D. wrong: π/4 radians is an eighth of a rotation.

53 If a stone of mass 1

If a stone of mass 1 Kg is whirled in a horizontal circle (radius = 1 m) with velocity 1 m/s, then the period is:

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

A. wrong: T = 2πr/v = 2π × 1/1 = 2π s, not 4π s.

B. correct: T = 2πr/v = 2π s.

C. wrong: T = 2π s, not π/2 s.

D. wrong: 2π/2 = π s, not the period.

Note: Note: The velocity figure is cut at the right page edge in the scan; it is recovered as 1 m/s from the keyed period (T = 2πr/v = 2π s with r = 1 m).

Question 54 The relation between linear and angular

The relation between linear and angular acceleration is:

- A. a = rα ✓ **Correct answer**
- B. a = r / α
- C. a = r^2 α
- D. A = r α^2

A. correct: linear acceleration a = rα, the radius times the angular acceleration.

B. wrong: a = rα, not r/α.

C. wrong: a = rα, not $r^2\alpha$.

D. wrong: a = rα, not $r\alpha^2$.

55 Non protein but inorganic detachable co-factor

Non protein but inorganic detachable co-factor is called:

- A. Activator ✓ **Correct answer**
- B. Prosthetic group
- C. Co-enzyme
- D. Apoenzyme

A. correct: a non-protein inorganic detachable co-factor is an activator (for example Mg2+).

B. wrong: a prosthetic group is a non-protein co-factor that is firmly attached, not detachable.

C. wrong: a co-enzyme is an organic (non-protein) co-factor, not inorganic.

D. wrong: the apoenzyme is the protein part of the enzyme, not a co-factor.

Question 56 Lock and Key Model for enzyme

Lock and Key Model for enzyme action proposed by Emil Fischer suggests that:

- A. Enzymes are unbiased for the substrate
- B. Enzymes can modify their active sites
- C. Enzymes are restricted to one reaction type ✓ **Correct answer**
- D. An enzyme can catalyze variety of reactions

A. wrong: the Lock and Key model says enzymes are specific to one substrate, not unbiased.

B. wrong: modifying the active site to fit the substrate is the Induced Fit model, not Lock and Key.

C. correct: Lock and Key says each enzyme fits only its specific substrate, so it is restricted to one reaction type.

ck and key says an enzyme catalyses one specific reaction, not a variety.

Question 57 Enzymes work by lowering the _____

Enzymes work by lowering the _____ of the reactions they catalyse:

- A. Kinetic energy
- B. Activation energy ✓ **Correct answer**
- C. Heat energy
- D. Potential energy

A. wrong: enzymes lower the activation energy, not the kinetic energy.

B. correct: enzymes speed up reactions by lowering the activation energy.

C. wrong: enzymes lower the activation energy, not the heat energy.

D. wrong: enzymes lower the activation energy, not the potential energy.

Question 58 The frequency of a mutant gene

The frequency of a mutant gene in a population would be likely to be increased if:

- A. The gene were selectively advantageous ✓ **Correct answer**
- B. The gene were dominant
- C. The gene were sex linked
- D. The population increase

A. correct: a mutant gene spreads if it gives its bearer a selective advantage.

B. wrong: dominance alone does not increase a gene's frequency; selection does.

C. wrong: being sex-linked does not by itself increase a gene's frequency.

D. wrong: population increase does not by itself raise the frequency of a particular gene.

59 Which statement is not correct for

Which statement is not correct for the Darwin's theory of natural selection?

- A. Survival in the struggle for existence is random ✓ **Correct answer**
- B. The fit individuals leave more off springs into their environment
- C. The unequal ability of individuals to survive and reproduce will lead to a gradual
- D. Accumulation over the generations thus leading to the evolution of a new species

A. correct: this is the statement that is not correct for Darwin's theory: survival is not random, it is the fitter individuals that survive and reproduce.

B. wrong: fitter individuals leaving more offspring is a correct statement of natural selection.

C. wrong: unequal survival and reproduction leading to gradual change is a correct statement of natural selection.

D. wrong: accumulation over generations leading to a new species is a correct statement of natural selection.

Note: Note: Options C and D print as two halves of one sentence (C ends "will lead to a gradual", D continues "Accumulation over the generations..."); both are correct statements of Darwinism, and A is the only incorrect statement.

Question 60 A general formula is derived by

A general formula is derived by one of the following scientist for calculating the frequencies of alleles and genotypes in population at equilibrium:

- A. Linnaeus
- B. Lamarck
- C. Darwin
- D. Hardy Weinberg ✓ **Correct answer**

A. wrong: Linnaeus classified organisms; he did not derive the allele-frequency formula.

marck proposed inheritance of acquired characters, not the equilibrium formula.

C. wrong: Darwin proposed natural selection, not the equilibrium formula.

D. correct: the Hardy-Weinberg equation ($p^2 + 2pq + q^2 = 1$) gives allele and genotype frequencies at equilibrium.

Question 61 When humans purposefully apply selection pressure

When humans purposefully apply selection pressure to populations, the process is known as:

- A. Natural selection
- B. Artificial selection ✓ **Correct answer**
- C. Evolution
- D. Genetic drift

A. wrong: natural selection is selection by nature, not by humans.

B. correct: deliberate selection by humans is artificial selection.

C. wrong: evolution is the change itself, not the human application of selection pressure.

D. wrong: genetic drift is random change in allele frequency, not human selection.

Question 62 Which may NOT be a possible

Which may NOT be a possible action of interferons?

- A. Belongs to cytokines
- B. Activate natural killer cells
- C. Activate immune cells
- D. Secrete interleukin ✓ **Correct answer**

A. wrong: interferons are cytokines, so this is a possible action.

terferons activate natural killer cells, so this is a possible action.

C. wrong: interferons activate immune cells, so this is a possible action.

D. correct: interferons do not secrete interleukin; interleukins are a different group of cytokines.

Question 63 Which Proteolytic enzyme is NOT secreted

Which Proteolytic enzyme is NOT secreted in inactive form?

- A. Chymotrypsin
- B. Pepsin
- C. Trypsin
- D. Erypsin ✓ **Correct answer**

A. wrong: chymotrypsin is secreted as inactive chymotrypsinogen.

B. wrong: pepsin is secreted as inactive pepsinogen.

C. wrong: trypsin is secreted as inactive trypsinogen.

D. correct: erepsin (printed "Erypsin") is a mixture of intestinal peptidases secreted in active form.

Note: Note: "Erypsin" is the print's spelling of erepsin, the mixture of intestinal peptidases, which is secreted active rather than as a zymogen.

Question 64 In human heart, the left atrium

In human heart, the left atrium receives:

- A. The Superior Vena Cava
- B. The Inferior Vena Cava
- C. The Coronary Sinus
- D. The four Pulmonary Veins ✓ **Correct answer**

e superior vena cava drains into the right atrium.

B. wrong: the inferior vena cava drains into the right atrium.

C. wrong: the coronary sinus drains into the right atrium.

D. correct: the four pulmonary veins bring oxygenated blood into the left atrium.

Question 65 Choose the correct pathway for the

Choose the correct pathway for the flow of blood:

- A. Arterioles --- metarterioles --- thoroughfare channel --- capillaries ✓ **Correct answer**
- B. Capillaries --- thoroughfare channel --- metarterioles --- arterioles
- C. Thoroughfare channel --- metarterioles --- capillaries --- arterioles
- D. Metarterioles --- arterioles --- thoroughfare channels --- capillaries

A. correct: blood flows from arterioles to metarterioles, then through the thoroughfare channel to the capillaries.

B. wrong: this is the reverse of the blood flow direction.

C. wrong: the flow starts at the arterioles, not the thoroughfare channel.

D. wrong: the arterioles come before the metarterioles, not after.

Question 66 Regarding structure of the human heart

Regarding structure of the human heart, Chordae tendinae are present in:

- A. Atria
- B. Pulmonary valve
- C. Ventricles ✓ **Correct answer**
- D. Aortic valve

A. wrong: chordae tendinae are attached to the atrioventricular valves in the ventricles.

ordae tendinae are not present in the pulmonary valve.

C. correct: chordae tendinae are the tendinous cords in the ventricles that hold the atrioventricular valve cusps.

D. wrong: chordae tendinae are not present in the aortic valve.

Question 67 In human gut, chylomicrons are formed

In human gut, chylomicrons are formed by the combination of:

- A. Proteins and carbohydrates
- B. Fats and proteins ✓ **Correct answer**
- C. Fats and carbohydrates
- D. Vitamins and fats

A. wrong: chylomicrons are formed from fats (lipids) and proteins, not carbohydrates.

B. correct: chylomicrons are lipoprotein droplets of fats and proteins formed in the gut wall.

C. wrong: chylomicrons are fats with proteins, not fats with carbohydrates.

D. wrong: chylomicrons are fats with proteins, not vitamins and fats.

Question 68 The pathways of water transport in

The pathways of water transport in which water moves through plasmodesmata is:

- A. Apoplast
- B. Symplast ✓ **Correct answer**
- C. Vacuolar
- D. Ascent of sap

A. wrong: the apoplast pathway is through cell walls and intercellular spaces, not through plasmodesmata.

…e symplast pathway is through the cytoplasm connected by plasmodesmata.

C. wrong: the vacuolar pathway is through vacuoles, not plasmodesmata.

D. wrong: ascent of sap is the upward movement of water in the xylem, not the plasmodesmatal pathway.

Question 69 In which phase of bacterial growth

In which phase of bacterial growth, they divide at exponential rate:

- A. Lag phase
- B. Log phase ✓ **Correct answer**
- C. Stationary phase
- D. Decline phase

A. wrong: in the lag phase bacteria adapt and do not divide rapidly.

B. correct: in the log (exponential) phase bacteria divide at an exponential rate.

C. wrong: in the stationary phase growth stops as deaths balance divisions.

D. wrong: in the decline phase the population falls.

Question 70 The unique macro-molecule in the bacterial

The unique macro-molecule in the bacterial cell wall is:

- A. Polysaccharides
- B. Proteins
- C. Peptidoglycan ✓ **Correct answer**
- D. Cholesterol

A. wrong: polysaccharides occur in many walls, but the unique bacterial macromolecule is peptidoglycan.

B. wrong: proteins occur in many cells, but the unique bacterial wall molecule is

C. correct: peptidoglycan (murein) is unique to bacterial cell walls.

D. wrong: cholesterol is absent from bacterial cell walls; it occurs in animal membranes.

Question 71 Function of pilus in bacteria is

Function of pilus in bacteria is to:

- A. Increase pathogenicity
- B. Degrade host plasma membrane
- C. Degrade host enzymes
- D. Exchange genetic material ✓ **Correct answer**

A. wrong: increasing pathogenicity is a function of the capsule, not the pilus.

B. wrong: pili do not degrade the host plasma membrane.

C. wrong: pili do not degrade host enzymes.

D. correct: pili (conjugation pili) transfer genetic material between bacteria.

Question 72 Which of the following is absent

Which of the following is absent from membrane of prokaryotes?

- A. Glycolipid
- B. Cholesterol ✓ **Correct answer**
- C. Glycoprotein
- D. Phospholipid

A. wrong: glycolipids occur in prokaryotic membranes.

B. correct: cholesterol is absent from prokaryotic membranes (it is a feature of eukaryotic, mainly animal, membranes).

ycoproteins occur in prokaryotic membranes.

D. wrong: phospholipids are the main component of prokaryotic membranes.

Note: Note: Q90 prints this same question again verbatim (same stem and options); both are served as printed, both keyed B.

Question 73 Which of the following is NOT

Which of the following is NOT the function of lysosomes?

- A. Intracellular digestion
- B. Autophagy
- C. Autolysis
- D. Processing of cell secretions ✓ **Correct answer**

A. wrong: intracellular digestion is a function of lysosomes.

B. wrong: autophagy (digesting the cell's own worn-out parts) is a function of lysosomes.

C. wrong: autolysis (self-digestion) is a function of lysosomes.

D. correct: processing of cell secretions is a function of the Golgi apparatus, not of lysosomes.

Question 74 Peripheral parts of cell are often

Peripheral parts of cell are often like a:

- A. Sol
- B. Gel ✓ **Correct answer**
- C. Colloidal
- D. True solution

A. wrong: the peripheral cytoplasm is gel-like (ectoplasm), not sol-like.

B. correct: the peripheral cytoplasm (ectoplasm) is gel-like, while the inner cytoplasm is

C. wrong: the cytoplasm is colloidal overall, but its peripheral part is specifically gel-like.

D. wrong: the peripheral cytoplasm is gel-like, not a true solution.

Question 75 The membrane separating the vacuole from

The membrane separating the vacuole from cytoplasm is called:

- A. Cristae
- B. Cisternae
- C. Tonoplast ✓ **Correct answer**
- D. Vacuolar membrane

A. wrong: cristae are folds of the inner mitochondrial membrane.

B. wrong: cisternae are flattened sacs of the endoplasmic reticulum and Golgi.

C. correct: the tonoplast is the membrane separating the vacuole from the cytoplasm.

D. wrong: "vacuolar membrane" is a description, not the name; the membrane is called the tonoplast.

Question 76 Which part of plasma membrane controls

Which part of plasma membrane controls the fluidity of the membrane:

- A. Glycoprotein
- B. Carrier protein
- C. Lipid ✓ **Correct answer**
- D. Carbohydrates

A. wrong: glycoproteins are involved in cell recognition, not in controlling fluidity.

B. wrong: carrier proteins transport substances; they do not control fluidity.

e lipid composition (including cholesterol) controls the fluidity of the plasma membrane.

D. wrong: carbohydrates are involved in recognition, not in controlling fluidity.

Question 77 The junction between the axon ending

The junction between the axon ending of a neuron and the dendrites of another neuron is called:

- A. Synapse ✓ **Correct answer**
- B. Nissl's body
- C. Neuroglia
- D. Myelin sheath

A. correct: the junction between an axon ending and the dendrites of another neuron is a synapse.

B. wrong: Nissl's bodies are granules in the neuron cell body, not a junction.

C. wrong: neuroglia are supporting cells, not a junction.

D. wrong: the myelin sheath insulates the axon; it is not a junction.

Question 78 Which body function is controlled through

Which body function is controlled through positive feed-back mechanism?

- A. Labor pains ✓ **Correct answer**
- B. Body temperature
- C. Insulin production
- D. Thyroxin release

A. correct: labour pains are driven by positive feedback: oxytocin release increases contractions, which release more oxytocin.

dy temperature is controlled by negative feedback.

C. wrong: insulin production is controlled by negative feedback.

D. wrong: thyroxin release is controlled by negative feedback.

Question 79 Hormone released during child birth and

Hormone released during child birth and in nursing women is:

- A. Estrogen
- B. Progesterone
- C. Calcitonin
- D. Oxytocin ✓ **Correct answer**

A. wrong: estrogen prepares the uterus but is not the hormone of childbirth and nursing.

B. wrong: progesterone maintains pregnancy; it is not the hormone of childbirth and nursing.

C. wrong: calcitonin regulates blood calcium; it is not involved in childbirth or nursing.

D. correct: oxytocin causes uterine contractions in childbirth and milk ejection during nursing.

Question 80 During non-conducting state, the neuron membrane

During non-conducting state, the neuron membrane is permeable to efflux of:

- A. K+ ✓ **Correct answer**
- B. Na+
- C. Ca+
- D. Cl-

A. correct: at rest the neuron membrane is mainly permeable to potassium ions, which leak out (efflux).

dium ions enter during the action potential, not during the resting state.

C. wrong: calcium ions are not the ion leaking out at rest.

D. wrong: chloride ions are not the ion leaking out at rest.

Question 81 GABA is an example of

GABA is an example of:

- A. Enzyme
- B. Inhibitory neurotransmitter ✓ **Correct answer**
- C. Excitatory neurotransmitter
- D. Hormone

A. wrong: GABA is not an enzyme; it is a neurotransmitter.

B. correct: GABA (gamma-aminobutyric acid) is the main inhibitory neurotransmitter.

C. wrong: GABA inhibits, it does not excite, the postsynaptic neuron.

D. wrong: GABA is a neurotransmitter, not a hormone.

Question 82 What is the fate of neurotransmitters

What is the fate of neurotransmitters after provoking impulse in postsynaptic membrane?

- A. Stay in synaptic cleft indefinitely
- B. Recycled in synaptic cleft
- C. Degraded by enzyme ✓ **Correct answer**
- D. Taken up by postsynaptic membrane

A. wrong: neurotransmitters do not stay in the cleft indefinitely; they are removed.

B. wrong: recycling happens after uptake, not in the cleft itself; the FSc answer is enzymatic degradation.

the FSc treatment the transmitter is removed by enzymatic degradation (for example acetylcholinesterase). See the note on Q82.

D. wrong: uptake is by the presynaptic membrane, not the postsynaptic membrane.

Note: Note: In the FSc treatment the transmitter is cleared by enzymatic degradation (for example acetylcholinesterase breaks down acetylcholine); reuptake and recycling also occur for some transmitters.

Question 83 Negative feedback mechanism is the characteristics

Negative feedback mechanism is the characteristics of which class?

- A. Class Fish
- B. Class Amphibian
- C. Class Reptilia
- D. Class Mammalia ✓ **Correct answer**

A. wrong: negative feedback is not given as a characteristic of fish.

B. wrong: negative feedback is not given as a characteristic of amphibians.

C. wrong: negative feedback is not given as a characteristic of reptiles.

D. correct: precise homeostatic control by negative feedback is characteristic of mammals.

Question 84 Which of the following is true

Which of the following is true about Amoebae?

- A. They have flagella
- B. They are multicellular
- C. They do not cause any disease in humans
- D. They move by forming specialized cytoplasmic projections called pseudopodia ✓ **Correct answer**

noebae move by pseudopodia, not by flagella.

B. wrong: amoebae are unicellular, not multicellular.

C. wrong: some amoebae cause disease in humans (for example Entamoeba histolytica).

D. correct: amoebae move by forming pseudopodia, temporary cytoplasmic projections.

Question 85 Select an anamnoites from the following

Select an anamnoites from the following:

- A. Snake
- B. Parrot
- C. Frog ✓ **Correct answer**
- D. Crocodile

A. wrong: snakes are amniotes (reptiles lay shelled eggs).

B. wrong: parrots are amniotes (birds lay shelled eggs).

C. correct: frogs are anamniotes (amphibians lay eggs without an amnion).

D. wrong: crocodiles are amniotes (reptiles lay shelled eggs).

Note: Note: The stem prints "anamnoites" (misprint for "anamniotes").

Question 86 Multicellular, heterotrophic nutrition, cell walls are

Multicellular, heterotrophic nutrition, cell walls are never present in their cells, which kingdom do these organisms belong to?

- A. Kingdom Protoctista
- B. Kingdom Fungi
- C. Kingdom Plantae
- D. Kingdom Animalia ✓ **Correct answer**

protoctista are mostly unicellular and include photosynthetic forms.

B. wrong: fungi have cell walls of chitin.

C. wrong: plants are autotrophic and have cell walls.

D. correct: animals are multicellular, heterotrophic, and their cells have no cell walls.

Question 87 Select a regulatory enzyme

Select a regulatory enzyme:

- A. Urease
- B. Hexokinase ✓ **Correct answer**
- C. Maltase
- D. Sucrase

A. wrong: urease is not a regulatory enzyme.

B. correct: hexokinase is a regulatory (allosteric, rate-limiting) enzyme of glycolysis.

C. wrong: maltase is a digestive enzyme, not a regulatory enzyme.

D. wrong: sucrase is a digestive enzyme, not a regulatory enzyme.

Question 88 Many enzymes are secreted in inactive

Many enzymes are secreted in inactive form to protect:

- A. Mitochondria
- B. Cell DNA
- C. Cell membrane
- D. Vacuole

No answer is given for this question, and none is taught. DEFECTIVE — EXCLUDED, no answer asserted (printed key C "Cell membrane"; no correct option is offered — the textbook answer is "cell proteins", which is not among the options; decided by the

A. wrong: enzymes are not secreted inactive to protect the mitochondria; the textbook answer is the cell's own proteins, which is not among the options.

B. wrong: enzymes are not secreted inactive to protect the cell DNA; the textbook answer is the cell's own proteins, which is not among the options.

C. wrong: this is the keyed answer, but it is not the textbook answer: enzymes are secreted inactive to protect the cell's own proteins, which is not among the options.

D. wrong: enzymes are not secreted inactive to protect the vacuole; the textbook answer is the cell's own proteins, which is not among the options. No correct option is offered, so this question is DEFECTIVE-excluded.

Question 89 Mesosomes are the invagination of which

Mesosomes are the invagination of which bacterial cell structure?

- A. Cell wall
- B. Plasma membrane ✓ **Correct answer**
- C. Plasmid
- D. Cysts

A. wrong: mesosomes are invaginations of the plasma membrane, not the cell wall.

B. correct: mesosomes are folds (invaginations) of the bacterial plasma membrane.

C. wrong: a plasmid is a small circular DNA molecule, not the structure mesosomes fold from.

D. wrong: cysts are resting structures, not the structure mesosomes fold from.

Question 90 Which of the following is absent

Which of the following is absent from membrane of prokaryotes?

- B. Cholesterol ✓ **Correct answer**
- C. Glycoprotein
- D. Phospholipid

A. wrong: glycolipids occur in prokaryotic membranes.

B. correct: cholesterol is absent from prokaryotic membranes (it is a feature of eukaryotic, mainly animal, membranes).

C. wrong: glycoproteins occur in prokaryotic membranes.

D. wrong: phospholipids are the main component of prokaryotic membranes.

Note: Note: This question is printed twice in the paper (see Q72); both are served as printed, both keyed B.

Question 91 Follicle Stimulating hormones (FSH) is secreted

Follicle Stimulating hormones (FSH) is secreted by:

- A. Ovary
- B. Pituitary gland ✓ **Correct answer**
- C. Adrenal gland
- D. Testes

A. wrong: the ovary produces estrogen and progesterone, not FSH.

B. correct: FSH is secreted by the anterior pituitary gland.

C. wrong: the adrenal gland produces corticosteroids and adrenaline, not FSH.

D. wrong: the testes produce testosterone, not FSH.

92 Which is NOT a function of

Which is NOT a function of testosterone?

- A. Inhibition of LH
- B. Sperm production
- C. Inhibition of FSH
- D. Limit spermatogenesis ✓ **Correct answer**

A. wrong: inhibition of LH is a function of testosterone (negative feedback).

B. wrong: sperm production is stimulated by testosterone.

C. wrong: inhibition of FSH is a function of testosterone (negative feedback).

D. correct: testosterone promotes spermatogenesis; it does not limit it.

Question 93 In human males, inhibin hormone is

In human males, inhibin hormone is produced by:

- A. Leyding cells
- B. Hensen's node cells
- C. Sertoli cells ✓ **Correct answer**
- D. Interstitial cells

A. wrong: Leydig (interstitial) cells produce testosterone, not inhibin.

B. wrong: Hensen's node is an embryonic structure, not a source of inhibin.

C. correct: inhibin is produced by the Sertoli cells of the seminiferous tubules.

D. wrong: interstitial cells (Leydig cells) produce testosterone, not inhibin.

Question 94 Which function is NOT directly performed

Which function is NOT directly performed by ovaries?

- B. Estrogen production
- C. Ovulation
- D. HCG production ✓ **Correct answer**

A. wrong: the ovaries do produce progesterone.

B. wrong: the ovaries do produce estrogen.

C. wrong: ovulation is the release of the egg by the ovary.

D. correct: HCG is produced by the placenta (chorion), not by the ovaries.

Question 95 During menstrual cycle, after the female

During menstrual cycle, after the female gamete is released from the ovary at ovulation, the remains of the follicle (Corpus Luteum) secretes:

- A. Progesterone ✓ **Correct answer**
- B. FSH
- C. LH
- D. Testosterone

A. correct: after ovulation the corpus luteum secretes progesterone.

B. wrong: FSH is secreted by the pituitary, not by the corpus luteum.

C. wrong: LH is secreted by the pituitary, not by the corpus luteum.

D. wrong: testosterone is a male hormone, not secreted by the corpus luteum.

Question 96 A condition in which a joint

A condition in which a joint becomes swollen painful and immoveable is called:

- A. Spondylosis
- B. Arthritis ✓ **Correct answer**

- D. Rickets

A. wrong: spondylosis is degeneration of the spine, not a swollen immovable joint.

B. correct: arthritis is inflammation of a joint, making it swollen, painful and immovable.

C. wrong: sciatica is pain along the sciatic nerve, not a joint condition.

D. wrong: rickets is softening of bones in children, not a swollen joint.

Question 97 Which feature is possessed by smooth

Which feature is possessed by smooth muscles?

- A. Multinucleate cells
- B. Contractile sarcomeres
- C. Uninucleate cells ✓ **Correct answer**
- D. Striated appearance

A. wrong: smooth muscle cells are uninucleate, not multinucleate.

B. wrong: smooth muscle lacks the organised sarcomeres of striated muscle.

C. correct: smooth muscle cells are uninucleate (single nucleus) and spindle-shaped.

D. wrong: smooth muscle is non-striated, not striated.

Question 98 Mature bone cells are called

Mature bone cells are called:

- A. Osteoblasts
- B. Osteocytes ✓ **Correct answer**
- C. Osteoclasts
- D. Chondrocytes

teoblasts are bone-forming cells, not mature bone cells.

B. correct: mature bone cells are osteocytes.

C. wrong: osteoclasts are bone-resorbing cells, not mature bone cells.

D. wrong: chondrocytes are cartilage cells, not bone cells.

Question 99 What do we call the cell

What do we call the cell surface membrane of a muscle fibre?

- A. Sarcolemma ✓ **Correct answer**
- B. Plasma membrane
- C. Sarcoplasm
- D. Myofibrils

A. correct: the cell surface membrane of a muscle fibre is the sarcolemma.

B. wrong: "plasma membrane" is the general term; the muscle fibre's membrane is specifically the sarcolemma.

C. wrong: sarcoplasm is the cytoplasm of a muscle fibre, not its membrane.

D. wrong: myofibrils are the contractile threads inside the fibre, not its membrane.

Question 100 It is an event that occurs

It is an event that occurs during meiosis-I, when chromatids of two chromosomes break and rejoin so that a part of one chromatid swaps places with the same part of the other:

- A. Crossing over ✓ **Correct answer**
- B. Autosomal linkage
- C. Chiasmata
- D. Gene mutation

A. correct: the breaking and rejoining of chromatids with exchange of parts during

rossing over.

B. wrong: autosomal linkage is the inheritance together of genes on the same autosome, not the exchange event.

C. wrong: chiasmata are the visible points where crossing over has happened, not the exchange itself.

D. wrong: gene mutation is a change in the DNA sequence, not an exchange of chromatid parts.

Question 101 A change in the structure of

A change in the structure of a DNA molecule, producing a different allele of a gene, is a:

- A. Chromosome mutation
- B. Gene mutation ✓ **Correct answer**
- C. Chromosomal aberrations
- D. Recombination

A. wrong: a change in chromosome structure is a chromosome mutation, not a gene mutation.

B. correct: a change in the structure of a DNA molecule producing a different allele is a gene mutation.

C. wrong: chromosomal aberrations are changes in chromosome number or structure, not a change within a gene.

D. wrong: recombination is the exchange of genetic material, not a change in DNA structure.

Question 102 Which of the following example of

Which of the following example of human inheritance is explained by multiple alleles on

al chromosome?

- A. The ABO blood group system ✓ **Correct answer**
- B. Cystic firbrosis
- C. Down's syndrome
- D. Haemophilia

A. correct: the ABO blood group system is explained by multiple alleles (IA, IB, i) on an autosomal chromosome.

B. wrong: cystic fibrosis is a single-gene recessive disorder, not a multiple-allele example.

C. wrong: Down's syndrome is a chromosomal abnormality (trisomy 21), not multiple alleles.

D. wrong: haemophilia is a sex-linked recessive disorder, not a multiple-allele example.

Note: Note: Option B prints "Cystic firbrosis" (misprint for "fibrosis").

Question 103 Phenotype is

Phenotype is:

- A. The genetic complement i.e the genes in an individual for a particular trait
- B. Partner of gene pair
- C. The form of appearance of a trait ✓ **Correct answer**
- D. The position of a gene on the chromosome

A. wrong: the genetic complement is the genotype, not the phenotype.

B. wrong: the partner of a gene pair is an allele, not the phenotype.

C. correct: the phenotype is the observable form of appearance of a trait.

D. wrong: the position of a gene on a chromosome is its locus, not the phenotype.

104 When a haemophilic carrier woman marries

When a haemophilic carrier woman marries a haemophilic man, who among her offspring's may be affected?

- A. All her children
- B. All her daughters
- C. Half of her daughters and all sons
- D. Half of her sons and half of her daughters ✓ **Correct answer**

A. wrong: not all children are affected; half the sons and half the daughters are affected.

B. wrong: only half the daughters are affected, not all of them.

C. wrong: half the daughters are affected, not all sons.

D. correct: a carrier woman (XhX) crossed with a haemophilic man (XhY) gives half affected sons, half normal sons, half affected daughters and half carrier daughters.

Question 105 The particular array of chromosomes that

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

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

A. wrong: the genotype is the genetic constitution, not the array of chromosomes.

B. wrong: the phenotype is the appearance, not the array of chromosomes.

C. correct: the particular array of chromosomes an individual possesses is its karyotype.

D. wrong: an allele is one form of a gene, not the array of chromosomes.

106 Which of the following is 'NOT

Which of the following is 'NOT RELATED' to enveloped virus?

- A. They survive for a short time
- B. Their envelope is sensitive to sun light
- C. They are tolerant to antibodies ✓ **Correct answer**
- D. Envelop is derived from host

A. wrong: enveloped viruses do survive only a short time outside the host, so this is related to them.

B. wrong: the envelope of enveloped viruses is sensitive to sunlight, so this is related to them.

C. correct: enveloped viruses are not tolerant to antibodies; their envelope is host-derived and they are readily inactivated, so this is NOT related to them.

D. wrong: the envelope of enveloped viruses is derived from the host cell membrane, so this is related to them.

Note: Note: Option D prints "Envelop" (misprint for "Envelope").

Question 107 Choose the organism which requires a

Choose the organism which requires a single cellular gene to encode the protein making up the organism:

- A. Viroid
- B. Prions ✓ **Correct answer**
- C. Virus
- D. Virion

A. wrong: a viroid is a naked RNA molecule; it needs no gene at all to encode a protein.

B. correct: prions are made of protein encoded by a single cellular gene of the host (the

C. wrong: a virus needs many genes to encode its proteins.

D. wrong: a virion is the complete virus particle, which needs many genes.

Question 108 _____ is transmitted through infected blood

_____ is transmitted through infected blood and hypodermic syringes:

- A. HIV ✓ **Correct answer**
- B. Influenza Virus
- C. Morbilli Virus (Measles)
- D. Vibrio Cholerae (Cholera)

A. correct: HIV is transmitted through infected blood and contaminated hypodermic syringes.

B. wrong: influenza spreads by droplets, not through blood or syringes.

C. wrong: measles spreads by droplets, not through blood or syringes.

D. wrong: cholera spreads through contaminated water and food, not through blood or syringes.

Question 109 _____ infection is caused by a

_____ infection is caused by a viroid:

- A. Hepatitis A
- B. Hepatitis D ✓ **Correct answer**
- C. Mad Cow disease
- D. Mysterious brain infection

A. wrong: hepatitis A is caused by a picornavirus, not a viroid.

B. correct: hepatitis D is the FSc textbook's viroid-caused infection (the delta agent is a

C. wrong: mad cow disease is caused by prions, not a viroid.

D. wrong: "mysterious brain infection" is not a viroid-caused infection.

Question 110 The final acceptor of both electrons

The final acceptor of both electrons & protons during light reactions of photosynthesis is:

- A. PQ
- B. PC
- C. Fd
- D. NADP+ ✓ **Correct answer**

A. wrong: plastoquinone carries electrons early in the chain, not as the final acceptor.

B. wrong: plastocyanin carries electrons in the chain, not as the final acceptor.

C. wrong: ferredoxin passes electrons to NADP+, so it is not the final acceptor.

D. correct: NADP+ is the final acceptor of electrons (and protons) in the light reactions, forming NADPH.

Question 111 The only copper containing protein involved

The only copper containing protein involved during light reactions of photosynthesis is:

- A. Plastoquinone
- B. Cytochrome
- C. Ferridoxin
- D. Plastocyanin ✓ **Correct answer**

A. wrong: plastoquinone contains no copper.

B. wrong: cytochrome contains iron (haem), not copper.

ferredoxin contains iron and sulphur, not copper.

D. correct: plastocyanin is the copper-containing protein of the light reactions.

Question 112 The end product of glycolysis in

The end product of glycolysis in anaerobic respiration is:

- A. Ethanol and Carbon dioxide
- B. Lactate
- C. Pyruvate ✓ **Correct answer**
- D. Acetyl CoA

A. wrong: ethanol and carbon dioxide are the end products in yeast, not the end product of glycolysis itself.

B. wrong: lactate is the end product in muscle, not the end product of glycolysis itself.

C. correct: glycolysis ends at pyruvate; lactate and ethanol are formed from pyruvate afterwards. See the note on Q112.

D. wrong: acetyl CoA is formed from pyruvate in aerobic respiration, not at the end of glycolysis.

Note: Note: Glycolysis itself ends at pyruvate; in anaerobic respiration the pyruvate is then reduced to lactate (muscle) or to ethanol and carbon dioxide (yeast).

Question 113 End product of Calvin cycle is

End product of Calvin cycle is:

- A. 3 phosphoglycerate
- B. 1-3 biphosphoglycerate
- C. Glyceraldehyde 3 phosphate ✓ **Correct answer**
- D. Glucose

phosphoglycerate is the first product of carbon fixation, not the end product of the cycle.

B. wrong: 1,3-bisphosphoglycerate is an intermediate of the cycle, not its end product.

C. correct: the net end product of the Calvin cycle is glyceraldehyde-3-phosphate (G3P).

D. wrong: glucose is built up from G3P outside the cycle; the cycle's own end product is G3P.

Question 114 Second most abundant bio element in

Second most abundant bio element in human body is:

- A. Oxygen
- B. Carbon ✓ **Correct answer**
- C. Hydrogen
- D. Nitrogen

A. wrong: oxygen is the most abundant bioelement, not the second.

B. correct: carbon (about 18%) is the second most abundant bioelement in the human body, after oxygen.

C. wrong: hydrogen is the third most abundant bioelement.

D. wrong: nitrogen is the fourth most abundant bioelement.

Question 115 The basic structural framework of all

The basic structural framework of all types of membranes are:

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

/colipids are minor membrane components, not the basic framework.

B. wrong: glycoproteins are minor membrane components, not the basic framework.

C. correct: in the FSc treatment membranes are lipoprotein in nature; the lipoprotein framework is the basic structure of all membranes.

D. wrong: nucleoproteins are not the framework of membranes.

Question 116 Three hydrophobic fatty acid tails and

Three hydrophobic fatty acid tails and a glycerol molecule join to form a:

- A. Monoglyceride
- B. Diglyceride
- C. Triglyceride ✓ **Correct answer**
- D. Phospholipid

A. wrong: a monoglyceride has one fatty acid tail.

B. wrong: a diglyceride has two fatty acid tails.

C. correct: three fatty acid tails joined to glycerol form a triglyceride.

D. wrong: a phospholipid has two fatty acid tails plus a phosphate group.

Question 117 The sugar which is part of

The sugar which is part of ribonucleic acid is:

- A. Ribulose
- B. Ribose ✓ **Correct answer**
- C. Deoxyribulose
- D. Deoxyribose

A. wrong: ribulose is a five-carbon sugar but not the sugar of RNA.

ribose is the sugar in ribonucleic acid (RNA).

C. wrong: deoxyribulose is not the sugar of RNA.

D. wrong: deoxyribose is the sugar of DNA, not RNA.

Question 118 Which of the following process involve

Which of the following process involve in decomposition of protein into Amino acids?

- A. Condensation
- B. Hydrolysis ✓ **Correct answer**
- C. Glycolysis
- D. Fixation

A. wrong: condensation joins molecules with loss of water; it does not break proteins down.

B. correct: hydrolysis breaks the peptide bonds of proteins to give amino acids.

C. wrong: glycolysis is the breakdown of glucose, not of proteins.

D. wrong: fixation is the incorporation of a gas (such as nitrogen or carbon dioxide), not protein breakdown.

Question 119 Select the protein providing support for

Select the protein providing support for the connective tissues:

- A. Histones
- B. Keratin
- C. Elastin ✓ **Correct answer**
- D. Collagen

A. wrong: histones package DNA, they do not support connective tissue.

B. wrong: keratin forms hair and nails, not connective tissue support.

elastin gives elasticity, but the main supporting protein of connective tissue is collagen.

D. correct: collagen is the protein that provides support for connective tissues.

Question 120 Fibrous proteins 'DO NOT' take part

Fibrous proteins 'DO NOT' take part in:

- A. Blood clotting
- B. Formation of nails
- C. Muscle contraction
- D. Oxygen transport in blood ✓ **Correct answer**

A. wrong: fibrinogen, a fibrous protein, takes part in blood clotting.

B. wrong: keratin, a fibrous protein, forms nails.

C. wrong: myosin, a fibrous protein, takes part in muscle contraction.

D. correct: oxygen transport in blood is carried out by haemoglobin, a globular protein, not a fibrous one.

Question 121 Outer membrane of mitochondria and chloroplast

Outer membrane of mitochondria and chloroplast resembles as both are:

- A. Freely permeable to large molecules
- B. Freely permeable to small molecules ✓ **Correct answer**
- C. Impermeable
- D. Semipermeable

A. wrong: the outer membranes are freely permeable to small molecules, not large ones.

B. correct: the outer membranes of mitochondria and chloroplasts are freely permeable to small molecules.

e outer membranes are permeable to small molecules, not impermeable.

D. wrong: the outer membranes are freely permeable to small molecules, not merely semipermeable.

Question 122 In mitochondria ATP synthase is located

In mitochondria ATP synthase is located on its:

- A. Outer Membrane
- B. Inter membrane space
- C. Inner membrane ✓ **Correct answer**
- D. Matrix

A. wrong: ATP synthase is on the inner membrane, not the outer membrane.

B. wrong: ATP synthase is on the inner membrane, not in the intermembrane space.

C. correct: ATP synthase is located on the inner membrane (cristae) of the mitochondrion.

D. wrong: ATP synthase is on the inner membrane, not in the matrix.

Question 123 A metal reacts vigorously with cold

A metal reacts vigorously with cold water melting in to a ball of molten metal, moves across the surface of water giving off Hydrogen gas and burns with yellowish golden flame. What could be the identity of this metal?

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

A. wrong: potassium burns with a lilac flame, not a yellowish golden flame.

B. correct: sodium reacts vigorously with cold water, melts into a ball, moves across the

burns with a yellowish golden flame.

C. wrong: lithium reacts slowly with water and does not burn with a golden flame.

D. wrong: calcium reacts steadily with water and sinks; it does not melt into a ball or burn with a golden flame.

Question 124 Among alkali metals which element reacts

Among alkali metals which element reacts slowly with H2O?

- A. Na
- B. K
- C. Rb
- D. Li ✓ **Correct answer**

A. wrong: sodium reacts vigorously with water, not slowly.

B. wrong: potassium reacts violently with water, not slowly.

C. wrong: rubidium reacts explosively with water, not slowly.

D. correct: lithium is the least reactive alkali metal and reacts slowly with water.

Question 125 Which element has smaller shielding effect

Which element has smaller shielding effect among the following?

- A. Mg ✓ **Correct answer**
- B. Ca
- C. Rb
- D. Sr

A. correct: magnesium has the fewest inner electron shells of the four, so it has the smallest shielding effect.

B. wrong: calcium has more inner shells than magnesium, so its shielding is greater.

bidium has far more inner shells than magnesium, so its shielding is greater.

D. wrong: strontium has more inner shells than magnesium, so its shielding is greater.

Question 126 In transition elements number of unpaired

In transition elements number of unpaired electrons increase upto group number:

- A. III B & IV B
- B. I B & II B
- C. IV B & III B
- D. V B & VI B ✓ **Correct answer**

A. wrong: the number of unpaired electrons increases up to group VB and VIB, not IIIB and IVB.

B. wrong: groups IB and IIB have filled d shells with few or no unpaired electrons.

C. wrong: the order is reversed; unpaired electrons increase up to VB and VIB.

D. correct: the number of unpaired electrons increases up to groups VB (5 unpaired) and VIB (6 unpaired).

Question 127 The binding energy of transitional elements

The binding energy of transitional elements weakens progressively upto group:

- A. III B
- B. IV B
- C. II B ✓ **Correct answer**
- D. V B

A. wrong: binding energy is weakest at group IIB, not IIIB.

B. wrong: binding energy is weakest at group IIB, not IVB.

C. correct: the binding (cohesive) energy is weakest at group IIB, whose filled d10 shells

est melting points (zinc, cadmium, mercury). See the note on Q127.

D. wrong: binding energy is weakest at group IIB, not VB.

Note: Note: The binding energy is weakest at group IIB: zinc, cadmium and mercury have filled d10 shells, no unpaired d electrons for metallic bonding, and the lowest melting points of the transition series.

Question 128 Metamers differ from each other due

Metamers differ from each other due to:

- A. Functional group
- B. Position of functional group
- C. Shifting of proton
- D. Distribution of carbon atoms around the functional group ✓ **Correct answer**

A. wrong: metamers have the same functional group; they differ in the carbon distribution around it.

B. wrong: differing in the position of the functional group is position isomerism, not metamerism.

C. wrong: shifting of a proton is tautomerism, not metamerism.

D. correct: metamers differ in the distribution of carbon atoms around the functional group.

Question 129 Isomerism due to shifting of proton

Isomerism due to shifting of proton from one atom to another in a same molecule is known as:

- A. Metamerism
- B. Tautomerism ✓ **Correct answer**
- C. Position

A. wrong: metamerism is a difference in carbon distribution around a functional group.

B. correct: tautomerism is isomerism from the shifting of a proton from one atom to another in the same molecule.

C. wrong: position isomerism is a difference in the position of the functional group.

D. wrong: functional isomerism is a difference in the functional group itself.

Question 130 The type of isomerism existing in

The type of isomerism existing in a compound of molecular formula C2H6O is:

- A. Functional group ✓ **Correct answer**
- B. Position
- C. Chain
- D. Metamerism

A. correct: C2H6O exists as ethanol (an alcohol) and dimethyl ether (an ether), which are functional group isomers.

B. wrong: ethanol and dimethyl ether differ in functional group, not in position.

C. wrong: ethanol and dimethyl ether do not differ in the carbon chain.

D. wrong: ethanol and dimethyl ether are not metamers.

Question 131 Benzene is prepared in the laboratory

Benzene is prepared in the laboratory from sodium benzoate in the presence of:

- A. Dil : NaOH
- B. Alc : KOH
- C. NaOH + CaO ✓ **Correct answer**
- D. Na / Ether

ute NaOH does not decarboxylate sodium benzoate to benzene.

B. wrong: alcoholic KOH is used for dehydrohalogenation, not for preparing benzene from sodium benzoate.

C. correct: heating sodium benzoate with soda lime (NaOH + CaO) decarboxylates it to benzene.

D. wrong: sodium in ether is used in the Wurtz reaction, not for preparing benzene from sodium benzoate.

Question 132 Which of the following will not

Which of the following will not give substitution reaction?

- A. CH3 - CH3
- B. CH2 = CH2 ✓ **Correct answer**
- C. CH ≡ CH
- D. C6H6

A. wrong: ethane (an alkane) undergoes free-radical substitution.

B. correct: ethene (an alkene) gives addition reactions, not substitution.

C. wrong: ethyne can undergo substitution of its acetylenic hydrogen.

D. wrong: benzene undergoes electrophilic substitution.

Question 133 If both double and triple bonds

If both double and triple bonds are present then ending given to the root is:

- A. enyne ✓ **Correct answer**
- B. ene
- C. yne
- D. ane

compound with both a double and a triple bond ends in "enyne".

B. wrong: "ene" is the ending for a double bond only.

C. wrong: "yne" is the ending for a triple bond only.

D. wrong: "ane" is the ending for a saturated compound.

Question 134 Which compound is least reactive?

Which compound is least reactive?

- A. Ethane ✓ **Correct answer**
- B. Ethene
- C. Benzene
- D. Ethyne

A. correct: ethane is saturated, with only strong single bonds, so it is the least reactive.

B. wrong: ethene has a reactive double bond, so it is more reactive than ethane.

C. wrong: benzene is more reactive than ethane (it undergoes substitution).

D. wrong: ethyne has a reactive triple bond, so it is more reactive than ethane.

Question 135 The correct order of reactivity of

The correct order of reactivity of hydrocarbons is:

- A. Alkanes > Alkynes > Alkenes
- B. Alkenes > Alkanes > Alkynes
- C. Alkynes > Alkenes > Alkanes
- D. Alkenes > Alkynes > Alkanes ✓ **Correct answer**

A. wrong: alkanes are the least reactive, not the most.

B. wrong: alkynes are more reactive than alkenes, so they cannot come last.

e order of reactivity is alkynes > alkenes > alkanes.

D. wrong: alkenes are less reactive than alkynes, so they cannot come first.

Question 136 The function of NaOH in Adol

The function of NaOH in Adol condensation & Cannizaro's reaction respectively is:

- A. Nucleophile and electrophile
- B. Base and nucleophile ✓ **Correct answer**
- C. Electrophile and nucleophile
- D. Nucleophile and base

A. wrong: in the aldol condensation NaOH acts as a base, not a nucleophile.

B. correct: NaOH acts as a base in the aldol condensation (removing an alpha hydrogen) and as a nucleophile in the Cannizzaro reaction (attacking the carbonyl carbon).

C. wrong: NaOH is not an electrophile in either reaction.

D. wrong: the order is reversed; NaOH is a base in the aldol condensation and a nucleophile in the Cannizzaro reaction.

Note: Note: The stem prints "Adol" (misprint for "Aldol") and "Cannizaro's" (misprint for "Cannizzaro's").

Question 137 Which of the following is not

Which of the following is not true for increase in synthesis of ammonia by Haber's process? $N_2 + 3H_2 \rightleftharpoons 2NH_3$ ($\Delta H = -92.5$)

- A. Low temperature
- B. High pressure
- C. Continuous removal of NH3
- D. Continuous addition of NH3 ✓ **Correct answer**

low temperature favours the exothermic formation of ammonia, so this is true for increasing synthesis.

B. wrong: high pressure favours the side with fewer moles (ammonia), so this is true for increasing synthesis.

C. wrong: removing ammonia shifts the equilibrium forward, so this is true for increasing synthesis.

D. correct: continuously adding ammonia shifts the equilibrium backwards, so it does not increase synthesis.

Question 138 What is not true about the

What is not true about the Le - Chatelier's principle?

- A. Allow to predict the change in concentration on system at equilibrium
- B. Allow to predict the change in reaction rate on system at equilibrium ✓ **Correct answer**
- C. Allow to predict the change in pressure on system at equilibrium
- D. Allow to predict the change in temperature on system at equilibrium

A. wrong: Le Chatelier's principle does predict changes in concentration at equilibrium.

B. correct: Le Chatelier's principle predicts the direction of shift, not the change in reaction rate.

C. wrong: Le Chatelier's principle does predict changes with pressure at equilibrium.

D. wrong: Le Chatelier's principle does predict changes with temperature at equilibrium.

Question 139 For a gaseous phase reaction, when

For a gaseous phase reaction, when number of moles of reactants and products are equal:

values of Kp and Kc are different

- B. The value of Kp is greater that Kc
- C. The value of Kc is greater than Kp
- D. The values of Kp and Kc are the same ✓ **Correct answer**

A. wrong: when Δn = 0, Kp and Kc are equal, not different.

B. wrong: when Δn = 0, Kp = Kc, so Kp is not greater.

C. wrong: when Δn = 0, Kp = Kc, so Kc is not greater.

D. correct: Kp = Kc(RT)^Δn, and with Δn = 0 the two are the same.

Question 140 The rate constant "k" in the

The rate constant "k" in the rate equation is the rate of reaction when molar concentration of each of the reactant is:

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

A. correct: the rate constant k is the rate of reaction when the molar concentration of each reactant is 1 M.

B. wrong: k is the rate when each concentration is 1 M, not 2 M.

C. wrong: k is the rate when each concentration is 1 M, not 3 M.

D. wrong: k is the rate when each concentration is 1 M, not 4 M.

Note: Note: The word "molar" is cut at the right page edge in the scan and is restored from the standard definition (the rate constant is the rate when the molar concentration of each reactant is 1 M).

Question 141 The rate of reaction

The rate of reaction:

- A. Increases as the reaction proceeds
- B. Decreases as the reaction proceeds ✓ **Correct answer**
- C. Remains the same as the reaction proceeds
- D. Remains the same initially and then increases

A. wrong: the rate falls as reactants are used up, it does not increase.

B. correct: the rate of reaction decreases as the reaction proceeds, because the reactant concentrations fall.

C. wrong: the rate changes as the reaction proceeds; it does not remain the same.

D. wrong: the rate decreases from the start; it does not stay the same and then increase.

Question 142 For exothermic reactions ΔH° is written

For exothermic reactions ΔH° is written as:

- A. Zero
- B. Positive
- C. Negative ✓ **Correct answer**
- D. Constant

A. wrong: ΔH° is zero only for a thermoneutral reaction.

B. wrong: a positive ΔH° means an endothermic reaction.

C. correct: for an exothermic reaction heat is released, so ΔH° is negative.

D. wrong: ΔH° is not constant in value; it is negative for exothermic reactions.

143 Which of the following information we

Which of the following information we obtain from the Lattice energy?

- A. It helps while explaining the structure of the ionic compound ✓ **Correct answer**
- B. It explains bonding in the covalent compound
- C. It explains properties of the metallic compound
- D. It explains the structure of the molecular compound

A. correct: lattice energy helps explain the structure and stability of ionic compounds.

B. wrong: lattice energy concerns ionic compounds, not covalent bonding.

C. wrong: lattice energy concerns ionic compounds, not metallic compounds.

D. wrong: lattice energy concerns ionic compounds, not molecular compounds.

Question 144 In the reaction, Cr2O7-2 + 14

In the reaction, Cr2O7-2 + 14 H+ → 2 Cr+3 + 7H2O. How many electrons are gained or lost by chromium atom?

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

A. wrong: 12 electrons is the total charge change, not the change per chromium atom.

B. correct: each chromium atom goes from +6 to +3, gaining 3 electrons. See the note on Q144.

C. wrong: 6 electrons is the total for the two chromium atoms, not per atom.

D. wrong: chromium gains electrons (reduction), it does not lose them.

Note: Note: Per chromium atom 3 electrons are gained (Cr +6 to Cr +3); the equation as a

6 electrons for its two chromium atoms.

Question 145 The oxidation number of oxygen in

The oxidation number of oxygen in Na2O2 is:

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

A. correct: in sodium peroxide (Na2O2) the oxygen is in the peroxide ion O2 2-, so its oxidation number is -1.

B. wrong: +2 is not the oxidation number of oxygen in a peroxide.

C. wrong: -2 is the oxidation number of oxygen in oxides, not in peroxides.

D. wrong: +1 is not the oxidation number of oxygen in a peroxide.

Question 146 Which of the following will have

Which of the following will have positive electron affinity?

- A. Addition of electron to (Cl)
- B. Addition of electron to (Cl+)
- C. Addition of electron to (O)
- D. Addition of electron to (O-1) ✓ **Correct answer**

A. wrong: adding an electron to neutral chlorine releases energy, so its electron affinity is negative, not positive.

B. wrong: adding an electron to Cl+ is the reverse of ionisation, not electron affinity, and it releases energy.

C. wrong: adding an electron to neutral oxygen releases energy, so its electron affinity is

D. correct: adding an electron to O- costs energy (about +744 kJ/mol), the only positive value among the options. See the note on Q146.

Note: Note: Electron affinity is taken here as the energy change on attachment (positive means energy absorbed): adding an electron to O- costs about +744 kJ/mol, the only positive value among the options; adding an electron to neutral Cl or O releases energy.

Question 147 Which of the following molecule has

Which of the following molecule has sp2 hybridization?

- A. NH3
- B. BF3 ✓ **Correct answer**
- C. H2O
- D. BeCl2

A. wrong: ammonia (NH3) is sp3 hybridised.

B. correct: boron trifluoride (BF3) is sp2 hybridised (trigonal planar).

C. wrong: water (H2O) is sp3 hybridised.

D. wrong: beryllium chloride (BeCl2) is sp hybridised.

Question 148 Which of the following has small

Which of the following has small size?

- A. Mg
- B. S ✓ **Correct answer**
- C. P
- D. Na

A. wrong: magnesium is larger than sulphur (size falls across a period).

ulphur is furthest to the right in period 3, so it has the smallest size of the four.

C. wrong: phosphorus is larger than sulphur (size falls across a period).

D. wrong: sodium is the largest of the four (size falls across a period).

Question 149 The melting point of sulphur is

The melting point of sulphur is higher than that of phosphorous because:

- A. Sulphur has strong vander waals forces ✓ **Correct answer**
- B. Sulphur has weak vander waals forces
- C. Phosphorous has strong vander waals forces
- D. Phosphorous has weak vander waals forces

A. correct: sulphur (S8) has stronger van der Waals forces than phosphorus (P4), so its melting point is higher.

B. wrong: sulphur's van der Waals forces are stronger, not weaker, than those of phosphorus.

C. wrong: phosphorus has weaker van der Waals forces than sulphur, which is why its melting point is lower.

D. wrong: phosphorus having weak forces explains its lower melting point, not sulphur's higher one.

Question 150 Alkyl Halides involving -C-X bond breakage

Alkyl Halides involving -C-X bond breakage and -C-Nu bond formation simultaneously would follow the mechanism:

- A. SN1
- B. SN2 ✓ **Correct answer**
- C. E1
- D. E2

I1 is a two-step mechanism with carbocation formation, not simultaneous bond breaking and forming.

B. correct: SN2 is a single-step mechanism in which the C-X bond breaks and the C-Nu bond forms simultaneously.

C. wrong: E1 is a two-step elimination mechanism, not simultaneous substitution.

D. wrong: E2 is an elimination mechanism, not a substitution mechanism.

Question 151 50% inversion of configuration and 50%

50% inversion of configuration and 50% retention of configuration observed is characteristics of mechanism:

- A. E2
- B. E1
- C. SN1 ✓ **Correct answer**
- D. SN2

A. wrong: E2 is an elimination mechanism, not the one giving 50% inversion and 50% retention.

B. wrong: E1 is an elimination mechanism, not the one giving 50% inversion and 50% retention.

C. correct: SN1 proceeds through a planar carbocation attacked from either side, giving 50% inversion and 50% retention (racemisation).

D. wrong: SN2 gives complete inversion of configuration, not a 50-50 mixture.

Question 152 The order of reactivity of alcohol

The order of reactivity of alcohol when O-H bond breaks is:

- A. Primary alcohol > secondary alcohol > tertiary alcohol ✓ **Correct answer**

- B. Secondary alcohol > tertiary alcohol > primary alcohol
- C. Tertiary alcohol > secondary alcohol > Primary alcohol
- D. Primary alcohol > tertiary alcohol > secondary alcohol

A. wrong: primary alcohols are the least reactive when the O-H bond breaks.

B. wrong: secondary alcohols are intermediate, not the most reactive.

C. correct: the order of reactivity for O-H bond breaking is tertiary > secondary > primary alcohol.

D. wrong: primary alcohols are the least reactive, not the most.

Question 153 The following functional group is the

The following functional group is the result of oxidation of alcohol:

- A. Ketone / aldehyde ✓ **Correct answer**
- B. Aldehyde / alkane
- C. Ketone / alkane
- D. Aldehyde / acid

A. correct: oxidation of a primary alcohol gives an aldehyde and of a secondary alcohol a ketone.

B. wrong: oxidation of alcohols does not give alkanes.

C. wrong: oxidation of alcohols does not give alkanes.

D. wrong: the pair is ketone (from secondary alcohols) and aldehyde (from primary alcohols), not aldehyde and acid.

Question 154 The relative acidic strength of phenol

The relative acidic strength of phenol, water, alcohol & carboxylic acid is:

- A. -COOH > H2O > C6H5OH > OH

OH > C6H5OH > H2O > -OH ✓ **Correct answer**

- C. -COOH > -OH > C6H5OH > H2O
- D. -COOH > H2O > -OH > C6H5OH

A. wrong: phenol is more acidic than water, so it cannot come after water.

B. correct: the acidic strength order is carboxylic acid > phenol > water > alcohol.

C. wrong: alcohol is the weakest acid of the four, so it cannot come second.

D. wrong: phenol is more acidic than water, so it cannot come last.

Question 155 Aldehydes cannot be easily oxidized by

Aldehydes cannot be easily oxidized by:

- A. K2Cr2O7
- B. H2SO4
- C. KMnO4
- D. HCl ✓ **Correct answer**

A. wrong: potassium dichromate oxidises aldehydes to carboxylic acids.

B. wrong: concentrated sulphuric acid can oxidise aldehydes.

C. wrong: potassium permanganate oxidises aldehydes to carboxylic acids.

D. correct: hydrochloric acid is not an oxidising agent, so it cannot easily oxidise aldehydes.

Question 156 Aldehydes do not give which identification

Aldehydes do not give which identification test:

- A. 2,4 - DNPH test
- B. Tollen's Test
- C. Sodium Nitro Prusside Test ✓ **Correct answer**

A. wrong: aldehydes give a positive 2,4-DNPH test (orange precipitate).

B. wrong: aldehydes give a positive Tollens' test (silver mirror).

C. correct: the sodium nitroprusside test is for ketones (and thiols), not for aldehydes.

D. wrong: aldehydes give a positive Fehling's test (red precipitate).

Question 157 The hydrate percentage is maximum for

The hydrate percentage is maximum for:

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

A. wrong: propanal has a lower hydrate percentage than formaldehyde.

B. wrong: acetone has a lower hydrate percentage than formaldehyde.

C. correct: formaldehyde has the maximum hydrate percentage (its carbonyl carbon is the least hindered and most electrophilic).

D. wrong: acetaldehyde has a lower hydrate percentage than formaldehyde.

Question 158 When carboxylic acids are heated with

When carboxylic acids are heated with alcohol in the presence of concentrated H_2SO_4, the conversion of function group takes place from:

- A. Carboxyl to carbonyl group
- B. Carboxyl group to an ester group ✓ **Correct answer**
- C. Carbonyl to carboxyl group
- D. Carboxyl to hydroxyl group

e carboxyl group becomes an ester group, not a carbonyl group.

B. correct: heating a carboxylic acid with an alcohol in concentrated sulphuric acid converts the carboxyl group into an ester group (esterification).

C. wrong: the conversion is from carboxyl to ester, not from carbonyl to carboxyl.

D. wrong: the carboxyl group becomes an ester group, not a hydroxyl group.

Note: Note: The word "concentrated" is cut at the right page edge in the scan ("concen…") and is restored; the reaction is the acid-catalysed esterification.

Question 159 Thionyl chloride reacts with acetic acid

Thionyl chloride reacts with acetic acid resulting in transformation of Carboxylic group to:

- A. Acetamide
- B. Acid halide ✓ **Correct answer**
- C. Alcohol
- D. Ester

A. wrong: thionyl chloride converts a carboxylic acid to an acid chloride, not an amide.

B. correct: thionyl chloride converts the carboxylic group into an acid halide (acetyl chloride).

C. wrong: thionyl chloride converts a carboxylic acid to an acid chloride, not an alcohol.

D. wrong: thionyl chloride converts a carboxylic acid to an acid chloride, not an ester.

Question 160 Reactivity of carboxyl group is due

Reactivity of carboxyl group is due to presence of:

- A. Hydroxyl group
- B. Terminal hydrogen

- bonyl group ✓ **Correct answer**
- D. Alkyl group

A. wrong: the hydroxyl group alone does not cause the reactivity of the carboxyl group.

B. wrong: the terminal hydrogen is not the cause of the carboxyl group's reactivity.

C. correct: the reactivity of the carboxyl group is due to the carbonyl group (the polar C=O bond).

D. wrong: the alkyl group is not the cause of the carboxyl group's reactivity.

Question 161 The two functional groups present in

The two functional groups present in all amino acids are:

- A. Carboxylic acid and amino ✓ **Correct answer**
- B. Amino and aldehyde
- C. Ether and carboxylic acid
- D. Aldehyde and carboxylic acid

A. correct: every amino acid contains a carboxylic acid group (-COOH) and an amino group (-NH2).

B. wrong: amino acids contain an amino group, not an aldehyde group.

C. wrong: amino acids do not contain an ether group.

D. wrong: amino acids contain an amino group, not an aldehyde group.

Question 162 Enzyme is a natural substance that

Enzyme is a natural substance that:

- A. Increases the rate of chemical reaction ✓ **Correct answer**
- B. Decreases the rate of chemical reaction
- C. Has no effect on the rate of chemical reaction

os the chemical reaction

A. correct: an enzyme is a natural substance (a biological catalyst) that increases the rate of a chemical reaction.

B. wrong: enzymes increase the rate of reaction, not decrease it.

C. wrong: enzymes do affect the rate of reaction; they speed it up.

D. wrong: enzymes speed up reactions, they do not stop them.

Question 163 Number of H2O molecules in 10

Number of H2O molecules in 10 g of ice are:

- A. 3.34 x 10^23 ✓ **Correct answer**
- B. 0.331 x 10^23
- C. 33.1 x 10^23
- D. 10

A. correct: 10 g of ice is 10/18 = 0.556 mol, which is 0.556 × 6.02 × 10^23 = 3.34 × 10^23 molecules.

B. wrong: 0.331 × 10^23 is ten times too small.

C. wrong: 33.1 × 10^23 is ten times too large.

D. wrong: 10 is the mass in grams, not the number of molecules.

Question 164 The efficiency of chemical reaction can

The efficiency of chemical reaction can be expressed as:

- A. Theoretical yield
- B. Actual yield
- C. Percent yield ✓ **Correct answer**
- D. Maximum yield

e theoretical yield is the maximum possible yield, not the measure of efficiency.

B. wrong: the actual yield is the amount obtained, not the measure of efficiency.

C. correct: the efficiency of a reaction is expressed as the percent yield (actual yield divided by theoretical yield, times 100).

D. wrong: the maximum yield is the theoretical yield, not the measure of efficiency.

Question 165 1 mol of any substance contains

1 mol of any substance contains _____ particles:

- A. 6.02 x 10^23 ✓ **Correct answer**
- B. 6.02 x 10^24
- C. 6.02 x 10^22
- D. 3.01 x 10^23

A. correct: one mole of any substance contains Avogadro's number, 6.02 × 10^23 particles.

B. wrong: 6.02 × 10^24 is ten times Avogadro's number.

C. wrong: 6.02 × 10^22 is one tenth of Avogadro's number.

D. wrong: 3.01 × 10^23 is half of Avogadro's number.

Question 166 Which of the following orbital will

Which of the following orbital will be filled first than 4p?

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

A. wrong: 4s fills before 4p, but the question asks for the orbital filled immediately before

B. wrong: 2p fills before 4p, but not immediately before it.

C. correct: in the Aufbau order (1s 2s 2p 3s 3p 4s 3d 4p) the 3d orbital is filled immediately before 4p.

D. wrong: 1s fills before 4p, but not immediately before it.

Note: Note: 3d is the orbital filled immediately before 4p in the Aufbau order (1s 2s 2p 3s 3p 4s 3d 4p); 1s, 2p and 4s also fill earlier.

Question 167 If value of azimuthal quantum number

If value of azimuthal quantum number is 1 then value of m will range from:

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

A. correct: for l = 1, m ranges from -l to +l, that is -1, 0, +1.

B. wrong: for l = 1, m ranges from -1 to +1, not to +2.

C. wrong: for l = 1, m ranges from -1 to +1, not to +3.

D. wrong: for l = 1, m ranges from -1 to +1, not to +4.

Question 168 The dumbbell like orbitals can move

The dumbbell like orbitals can move in how many directions?

- A. 7
- B. 5
- C. 1
- D. 3 ✓ **Correct answer**

mbbell (p) orbitals have 3 orientations, not 7.

B. wrong: dumbbell (p) orbitals have 3 orientations, not 5.

C. wrong: dumbbell (p) orbitals have 3 orientations, not 1.

D. correct: dumbbell-shaped p orbitals can point in three directions (px, py, pz).

Question 169 The relationship between quantum number n

The relationship between quantum number n and l is :

- A. n = l-1
- B. l = n-2
- C. l = n-1 ✓ **Correct answer**
- D. n = l-2

A. wrong: the maximum value of l is n - 1, so n = l + 1, not l - 1.

B. wrong: l = n - 1, not n - 2.

C. correct: the azimuthal quantum number l can take values 0 to n - 1, so its maximum is l = n - 1.

D. wrong: l = n - 1, not the other way round.

Question 170 10 pascal is equal to

10 pascal is equal to:

- A. 0.000098 atm ✓ **Correct answer**
- B. 1.98 atm
- C. 10.019 kpa
- D. 4.014 psi

A. correct: 1 atm = 101325 Pa, so 10 Pa = 10/101325 ≈ 0.000098 atm.

0.98 atm is about 200000 Pa, not 10 Pa.

C. wrong: 10 Pa is 0.01 kPa, not 10.019 kPa.

D. wrong: 4.014 psi is about 27700 Pa, not 10 Pa.

Question 171 Intermolecular forces between molecules of ideal

Intermolecular forces between molecules of ideal gas are:

- A. Very strong
- B. Very weak
- C. Zero ✓ **Correct answer**
- D. Moderately strong

A. wrong: an ideal gas has no intermolecular forces at all.

B. wrong: an ideal gas has no intermolecular forces at all.

C. correct: by definition, the intermolecular forces between molecules of an ideal gas are zero.

D. wrong: an ideal gas has no intermolecular forces at all.

Question 172 The real gases show deviation from

The real gases show deviation from ideal behaviour at:

- A. Low temperature and low pressure
- B. High temperature and high pressure
- C. Low temperature and high pressure ✓ **Correct answer**
- D. High temperature and low pressure

A. wrong: low temperature increases deviation from ideal behaviour, even at low pressure.

B. wrong: real gases deviate most at low temperature and high pressure, not at high

and high pressure.

C. correct: real gases deviate from ideal behaviour at low temperature and high pressure, when molecules are close together and moving slowly.

D. wrong: real gases behave most ideally at high temperature and low pressure.

Question 173 Which of the following has the

Which of the following has the lowest vapour pressure at 20 degrees C?

- A. Diethyl ether
- B. Chloroform
- C. Carbon tetrachloride
- D. Water ✓ **Correct answer**

A. wrong: diethyl ether has the highest vapour pressure of the four.

B. wrong: chloroform has a higher vapour pressure than water.

C. wrong: carbon tetrachloride has a higher vapour pressure than water.

D. correct: water has the lowest vapour pressure at 20°C (strong hydrogen bonding holds its molecules together).

Question 174 The force of attraction among H2

The force of attraction among H2 molecules in solid H2 are:

- A. Hydrogen bonds
- B. Covalent bonds
- C. Co-ordinate covalent bonds
- D. Van Der Waal's Forces ✓ **Correct answer**

A. wrong: hydrogen bonds need a hydrogen attached to N, O or F; H2 has none.

B. wrong: covalent bonds hold the two H atoms together within a molecule, not between

C. wrong: co-ordinate covalent bonds are not the forces between H2 molecules.

D. correct: H2 molecules are held together only by van der Waals (London dispersion) forces.

Question 175 Which of the following molecules are

Which of the following molecules are soft and have weak intermolecular forces?

- A. H2O
- B. I2 ✓ **Correct answer**
- C. Sugar
- D. Graphite

A. wrong: water has strong hydrogen bonding, not weak intermolecular forces.

B. correct: iodine is a soft molecular solid held by weak van der Waals forces.

C. wrong: sugar has hydrogen bonding and is not a soft solid with weak forces.

D. wrong: graphite has strong covalent bonding within its layers.

Question 176 Which of the following solids have

Which of the following solids have strong metallic bond?

- A. Potassium
- B. Phosphorus
- C. Calcium ✓ **Correct answer**
- D. Sulphur

A. wrong: potassium has a weak metallic bond (it is a soft alkali metal).

B. wrong: phosphorus is a non-metal held by weak forces, not by a metallic bond.

lcium is an alkaline earth metal with a strong metallic bond.

D. wrong: sulphur is a non-metal held by weak forces, not by a metallic bond.

Question 177 The word 'RELUCTANT' means

The word 'RELUCTANT' means:

- A. Hesitant ✓ **Correct answer**
- B. Current
- C. Remarkable
- D. Rude

A. correct: "reluctant" means hesitant, unwilling to do something.

B. wrong: "current" means present or flowing, not reluctant.

C. wrong: "remarkable" means noteworthy, not reluctant.

D. wrong: "rude" means impolite, not reluctant.

Question 178 The SYNONYM of "Apparel" is

The SYNONYM of "Apparel" is:

- A. Dubious
- B. Disguise
- C. Dress ✓ **Correct answer**
- D. Apron

A. wrong: "dubious" means doubtful, not apparel.

B. wrong: "disguise" means a costume that hides identity, not apparel.

C. correct: "apparel" means clothing, so its synonym is "dress".

D. wrong: an "apron" is one garment, not a synonym for apparel in general.

179 The ANTONYM of " Endeavour" is

The ANTONYM of " Endeavour" is:

- A. Inaction ✓ **Correct answer**
- B. Inexact
- C. Effort
- D. Eat

A. correct: "endeavour" means effort, so its antonym is "inaction".

B. wrong: "inexact" means inaccurate, not the opposite of endeavour.

C. wrong: "effort" is a synonym of endeavour, not its antonym.

D. wrong: "eat" has nothing to do with endeavour.

Question 180 What is the ANTONYM of 'zealous'?

What is the ANTONYM of 'zealous'?

- A. Unenthusiastic ✓ **Correct answer**
- B. Religious
- C. Contagious
- D. Fanatic

A. correct: "zealous" means enthusiastic, so its antonym is "unenthusiastic".

B. wrong: "religious" is not the opposite of zealous.

C. wrong: "contagious" means spreading by contact, not the opposite of zealous.

D. wrong: "fanatic" is close to zealous in meaning, not its opposite.

Question 181 Fill in the blank with appropriate

Fill in the blank with appropriate article as required. It is _____ honor for me to address

- A. A
- B. An ✓ **Correct answer**
- C. The
- D. No article required

A. wrong: "a honor" is wrong because "honor" begins with a vowel sound.

B. correct: "an honor" is correct, because "honor" begins with a vowel sound (the h is silent).

C. wrong: "the" is not used here; the indefinite article "an" is required.

D. wrong: an article is required before "honor" here.

Question 182 Fill in the blank with appropriate

Fill in the blank with appropriate preposition. He was sitting next _____ her.

- A. With
- B. By
- C. To ✓ **Correct answer**
- D. At

A. wrong: "next with her" is not correct English.

B. wrong: "next by her" is not the correct preposition here.

C. correct: "next to her" is the correct preposition.

D. wrong: "next at her" is not correct English.

Question 183 Fill in the blank with appropriate

Fill in the blank with appropriate preposition. Each article was sold _____ over a pound.

- B. At ✓ **Correct answer**
- C. Off
- D. In

A. wrong: "sold out" means sold completely, not the price.

B. correct: "sold at over a pound" is the correct preposition for a price.

C. wrong: "sold off" means sold cheaply to clear stock, not the price.

D. wrong: "sold in" is not correct English for a price.

Question 184 What does the word "ANCESTOR" mean?

What does the word "ANCESTOR" mean?

- A. Collection of stars
- B. Branch of astrology
- C. Forefathers ✓ **Correct answer**
- D. Type of receptors

A. wrong: a collection of stars is a constellation, not an ancestor.

B. wrong: a branch of astrology is not an ancestor.

C. correct: an "ancestor" is a forefather, one from whom a person is descended.

D. wrong: a type of receptor is not an ancestor.

Question 185 The word 'BASHFUL' means

The word 'BASHFUL' means:

- A. Brimful
- B. Skillful
- C. Embarrassed ✓ **Correct answer**

A. wrong: "brimful" means full to the brim, not bashful.

B. wrong: "skillful" means skilled, not bashful.

C. correct: "bashful" means shy and embarrassed.

D. wrong: "wonderful" means marvellous, not bashful.

Question 186 Pick the correct option

Pick the correct option:

- A. Dr. Umer has reached, Dr. Jamal has not.
- B. Dr. Umer has reached; Dr. Jamal has not.
- C. Dr. Umer has reached/Dr. Jamal has not.
- D. Dr. Umer has reached: Dr. Jamal has not. ✓ **Correct answer**

A. wrong: two independent clauses joined by a comma alone is a comma splice.

B. correct: a semicolon correctly joins the two independent clauses.

C. wrong: a slash does not join two independent clauses.

D. wrong: a colon is not the correct punctuation here.

Question 187 Pick the correct option

Pick the correct option:

- A. The population of China is much more than Pakistan.
- B. The population of China are much more than Pakistan.
- C. The population of China is more than Pakistan.
- D. The population of China is much more than Pakistan's. ✓ **Correct answer**

A. wrong: the comparison is incomplete; "than Pakistan" needs "Pakistan's" (population).

opulation" is singular, so "are" is wrong.

C. wrong: "more than Pakistan" compares a population with a country; it needs "Pakistan's".

D. correct: "The population of China is much more than Pakistan's" correctly compares two populations.

Question 188 Pick the correct option

Pick the correct option:

- A. The machine printed the stuff which was new fast.
- B. The machine which was new printed the stuff fast. ✓ **Correct answer**
- C. The machine which was new printed fast the stuff.
- D. The machine which was new printed the stuff fastly.

A. wrong: the relative clause "which was new" is misplaced; it should describe the machine.

B. correct: "The machine which was new printed the stuff fast" has the clauses in their correct places.

C. wrong: "printed fast the stuff" has the wrong word order.

D. wrong: "fastly" is not a correct adverb; "fast" is the adverb.

Question 189 Choose the correct sentence

Choose the correct sentence:

- A. I wish I have been a millionaire.
- B. I wish I am being a millionaire.
- C. I wish I were a millionaire. ✓ **Correct answer**
- D. I wish I was a millionaire.

ter "I wish" the past subjunctive is needed; "have been" is wrong.

B. wrong: "am being" is wrong after "I wish".

C. correct: "I wish I were a millionaire" uses the correct past subjunctive.

D. wrong: "was" is used informally, but the correct subjunctive form is "were".

Question 190 The Town _____ its appearance completely

The Town _____ its appearance completely since 1980.

- A. Is changing
- B. Changed
- C. Has changed ✓ **Correct answer**
- D. Changes

A. wrong: "is changing" does not fit with "since 1980".

B. wrong: "changed" (simple past) does not fit with "since 1980".

C. correct: "has changed" (present perfect) is correct with "since 1980".

D. wrong: "changes" (simple present) does not fit with "since 1980".

Question 191 By next March, we _____ here

By next March, we _____ here for four years.

- A. Would had been
- B. Would have lived
- C. Shall have been living ✓ **Correct answer**
- D. Shall live

A. wrong: "would had been" is not a correct verb form.

B. wrong: "would have lived" does not express a duration continuing to next March.

shall have been living" (future perfect continuous) expresses a duration up to next March.

D. wrong: "shall live" does not express a duration up to next March.

Question 192 Fill in the blank with appropriate

Fill in the blank with appropriate option: The students, accompanied by the teacher _____ entering the museum.

- A. Is
- B. Has
- C. Are ✓ **Correct answer**
- D. Have

A. wrong: the subject is "the students" (plural), so "is" is wrong.

B. wrong: "has" is singular and does not fit the plural subject.

C. correct: "The students ... are entering"; the phrase "accompanied by the teacher" does not change the plural subject.

D. wrong: "have" does not fit the present continuous construction here.

Question 193 Fill in the blank with appropriate

Fill in the blank with appropriate option: None of us _____ beyond a mile.

- A. Gone
- B. Have gone
- C. Has gone ✓ **Correct answer**
- D. Were go

A. wrong: "gone" alone is not a complete verb form here.

B. wrong: "none of us" takes a singular verb here, so "have gone" is wrong.

None of us has gone beyond a mile" uses the singular verb with "none".

D. wrong: "were go" is not a correct verb form.

Question 194 Fill in the blank with appropriate

Fill in the blank with appropriate option: I _____ before 10 p.m.

- A. Shall have sleeped
- B. Shall have slept ✓ **Correct answer**
- C. Will have sleep
- D. Shall have been slept

A. wrong: "sleeped" is not the past participle of sleep.

B. correct: "shall have slept" is the correct future perfect form.

C. wrong: "will have sleep" needs the past participle "slept".

D. wrong: "shall have been slept" is not a correct form.

Question 195 Observe the pattern and select the

Observe the pattern and select the next term in sequence: ■■■■■■■, ■▲■■■■■, ■■■▲■■■.

- A. ■■■■■■■
- B. ■■■■▲■■
- C. ■■■■■▲■ ✓ **Correct answer**
- D. ■■■■■■▲

A. wrong: the triangle has moved two places each term, so the next term is not all squares.

B. wrong: the triangle would be at position 5, but the pattern moves it two places each term, to position 6.

e triangle moves two places to the right each term (positions 2, 4, then 6), so the next term is five squares, triangle, one square.

D. wrong: the triangle would be at position 7, but the pattern moves it to position 6.

Note: Note: Each term has 7 symbols; the triangle moves two places to the right each term (positions 2, 4, then 6).

Question 196 Read the following and choose the

Read the following and choose the correct answer: A man enters a room and finds a mirror. He looks at his shirt in the mirror and finds the following: ≤ WOIHA ≥. Another man enters the room and observes this man's shirt directly. Which of the following does he observe?

- A. ≥ WOIHA ≤
- B. ≤ AHIOW ≥ ✓ **Correct answer**
- C. ≤ WOIHA ≥
- D. ≥ AHIOW ≤

A. wrong: the mirror image reverses left and right, so the direct view is not the mirror image itself.

B. correct: a mirror reverses left and right, so the direct view is the mirror image of the mirror image: the end symbols swap back and the letters read in reverse order, giving "≤ AHIOW ≥".

C. wrong: the direct view is not the same as the mirror image.

D. wrong: the end symbols swap back in the direct view, so the outer symbols are "≤" on the left and "≥" on the right.

Note: Note: A mirror reverses left and right: the direct view is the mirror image of the mirror image, so the end symbols swap back and the letters read in reverse order.

197 Read the passage and the following

Read the passage and the following statements below. Then choose the correct option, basing your answer only on the information provided. Pakistan is rich in wildlife and culture. It is home to many sorts of wildlife, from the Ibex to the Indus River Dolphin; and people from most countries in the world have made their home here. Statements: I. Pakistan is a rich country. II. People from all nationalities of the world live in Pakistan. III. Pakistan is home to at least one dolphin species.

- A. Only III is correct ✓ **Correct answer**
- B. Only I and II are correct
- C. Only I and III are correct
- D. Only II and III are correct

A. correct: only III is correct. The passage says Pakistan is rich in wildlife and culture, not that it is a rich country (I is not stated), and that people from most countries live there, not all nationalities (II is not stated); it does name the Indus River Dolphin, so III follows.

B. wrong: I and II are not stated in the passage.

C. wrong: I is not stated in the passage; only III is correct.

D. wrong: II is not stated in the passage; only III is correct.

Question 198 A ball is a sphere. All

A ball is a sphere. All spheres are round. Some round things are mesmerizing. Which of the following conclusions is NECESSARILY TRUE? Conclusions: I. All balls are mesmerizing. II. All round things are spheres. III. Some mesmerizing things are spheres.

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

only III is necessarily true (see the note on Q198). I does not follow, because only some round things are mesmerising, and II does not follow, because not all round things are spheres.

B. wrong: neither I nor II follows.

C. wrong: II does not follow; not all round things are spheres.

D. wrong: I does not follow; only some round things are mesmerising.

Note: Note: III is the intended answer (the only conclusion the setter treats as following). Strictly, the mesmerising round things need not be spheres, so the question is loosely worded; I and II do not follow at all.

Question 199 I. There is sharp decline in

I. There is sharp decline in the production of oil seeds this year. II. The Government has decided to increase the import quantum of edible oil.

- A. Statement I is the cause and statement II is its effect ✓ **Correct answer**
- B. Statement II is the cause and statement I is its effect
- C. Both the statements I and II are independent causes
- D. Both the statements I and II are effects of independent causes

A. correct: the sharp decline in oilseed production (I) caused the government to increase edible oil imports (II).

B. wrong: the import decision is the effect, not the cause, of the production decline.

C. wrong: the two statements are linked as cause and effect, not independent causes.

D. wrong: the two statements are linked as cause and effect, not effects of independent causes.

200 Read the following statement, assuming everything

"Read the following statement, assuming everything in it to be true. Then decide which of the given suggested courses of action logically follow and are worth pursuing. Statement: Employees are arriving to work more than 5 minutes late every day. Courses of Action: I. Impose a strict penalty of half a day's pay every time someone is late. II. Apply a 15 minutes' buffer. Anyone who is late more than 2 times a month after this buffer period gets docked one day's pay."

- A. I
- B. II ✓ **Correct answer**
- C. Both I and II
- D. Neither I nor II

A. wrong: docking half a day's pay for a single 5-minute lateness is disproportionate and not worth pursuing.

B. correct: a 15-minute buffer with a penalty only after repeated lateness is a proportionate course of action worth pursuing.

C. wrong: course I is disproportionate, so both cannot be pursued.

D. wrong: course II is worth pursuing, so "neither" is wrong.

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