BS Nursing (BSN) Entry Test — 2023 · Solved Past Paper

Body: National Testing Service (NTS) · **Post:** BS Nursing (BSN) Entry Test · **Year:** 2023 · **Questions:** 100 in the original paper — **100 solved and verified**, none excluded · **Price:** Free

> **How to use this paper:** each question shows the stem, the four options, and the correct answer. Click “Why each option?” under a question to see all four options explained — one question teaches four topics. General Knowledge answers are as of the 2023 sitting.

Source note: trickipoint.com scan, 'BSN Nursing Entry Test Past Paper 2023' (accessed 10 Nov 2026; 12 pp, 100 stems numbered 1-100, YELLOW booklet code S-23-DNSK NURSING-YELLOW-2023-12475; sections English Q1-Q10, Physics Q11-Q40, Chemistry Q41-Q70, Botany and Zoology Q71-Q100). No printed key; p.12 carries a handwritten candidate's key of 100 answers, which was never trusted (wrong on at least 15 checkable items, e.g. Q7 D for E, Q8 B for A, Q29 D for B, Q48 A for D, Q52 B for C, Q83 A for D, Q99 B for C). Every answer was verified independently (own knowledge + worked derivations + targeted web sources for the doubtful items) under the owner's 8 Nov 2026 standard. 5 PICK-ONE, decided by the assistant under the owner's 8 Nov 2026 delegation: Q3 D, Q9 C, Q30 D, Q52 C, Q55 B (reasons in the file). Exact exam day not established — year only (37adp precedent).

Question 1 English

Complete the sentences by choosing the most appropriate word, from the given lettered choices (A to D) below each. Did Mr. Fahim _____ the reference book from the school library?

- B. borrow ✓ **Correct answer**
- C. lend
- D. sent

A. "Loan" as a verb means to give something on loan; Mr. Fahim is taking the book, not giving it.

B. "Borrow" means to take something for temporary use, which is exactly what Mr. Fahim does with the library book.

C. "Lend" means to give on loan, the opposite direction from what the sentence needs.

D. "Sent" does not fit the sense of taking a book from a library.

Question 2 English

Complete the sentences by choosing the most appropriate word, from the given lettered choices (A to D) below each. The _____ of the new hospital will start next month.

- A. constructive
- B. construction ✓ **Correct answer**
- C. construct
- D. constructed

A. "Constructive" is an adjective (helpful, positive); the sentence needs the noun for the building work.

B. "Construction" is the noun for the building work, and "the construction of the new hospital will start" is correct.

C. "Construct" is a verb (or a noun meaning an idea), not the building work.

D. "Constructed" is a past participle/adjective, not the noun the sentence needs.

3 English

Complete the sentences by choosing the most appropriate word, from the given lettered choices (A to D) below each. Timid by nature, the doctor, who was alone in his house, was frightened _____.

- A. out of wits
- B. out at his wits
- C. at his wits end
- D. out of his wits ✓ **Correct answer**

A. "Out of wits" appears in usage, but the full idiom takes the possessive ("out of one's wits"), so this is the weaker form.

B. "Out at his wits" is not an idiom.

C. "At his wits' end" means perplexed, not frightened, and the print lacks the possessive apostrophe.

D. "Frightened out of his wits" is the standard idiom for being extremely frightened; this is the intended answer (decided by assistant under owner's 8 Nov delegation; A is the only other form seen in usage).

Question 4 English

Complete the sentences by choosing the most appropriate word, from the given lettered choices (A to D) below each. Ahmed's energy was unbounded; his resourcefulness inexhaustible; and his equanimity in the face of danger almost _____.

- A. unreasonable
- B. uncanny ✓ **Correct answer**
- C. natural
- D. false

A. "Unreasonable" means not guided by reason; it does not describe an almost

calm in danger.

B. "Uncanny" means strangely remarkable, almost superhuman — exactly how his unnatural calm in danger is described.

C. "Natural" would make his calm ordinary, contradicting "unbounded" and "inexhaustible".

D. "False" would mean his calm was pretended, which the sentence does not say.

Question 5 English

Complete the sentences by choosing the most appropriate word, from the given lettered choices (A to D) below each. _____ from the campaigns have been used to buy medical supplies, food and educational materials.

- A. Revenue
- B. Return
- C. Proceed ✓ **Correct answer**
- D. Earnings

A. "Revenue" is singular and would take "has been used", but the verb is "have"; also revenue is income in general, not campaign takings.

B. "Return" (singular) does not agree with "have", and a single return is not what campaigns yield.

C. The intended word is "Proceeds" (the money raised by the campaigns, a plural noun agreeing with "have been used"); the option prints "Proceed" and is the intended answer.

D. "Earnings" is plural and agrees with "have", but earnings are profits of work or business, not money raised by campaigns.

Note: Note: Option C prints "Proceed" for "Proceeds" (see Reproduction notes).

6 English

Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters. CONCISE:

- A. short
- B. lengthy ✓ **Correct answer**
- C. brief
- D. to the point

A. "Short" is a synonym of "concise", not its opposite.

B. "Lengthy" means long and wordy, the direct opposite of "concise" (brief and to the point).

C. "Brief" is a synonym of "concise".

D. "To the point" is a synonym of "concise".

Question 7 English

Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters. AFFINITY:

- A. alliance
- B. liking
- C. sympathy
- D. attraction
- E. dislike ✓ **Correct answer**

A. "Alliance" is a bond or union, close in sense to "affinity", not its opposite.

B. "Liking" is a synonym of "affinity".

C. "Sympathy" is fellow-feeling, close to "affinity", not its opposite.

D. "Attraction" is a synonym of "affinity".

the direct opposite of "affinity" (a natural liking or attraction).

Question 8 English

Four lettered pairs (A to D) follow a related pair of words given in capitals. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair in capitals. KERNEL: NUT::

- A. yolk: egg ✓ **Correct answer**
- B. grape: raisin
- C. flour: bread
- D. soil: seed

A. The kernel is the inner part of a nut, just as the yolk is the inner part of an egg; both are part-to-whole (inner part : whole).

B. A raisin is a dried grape, a changed form, not the inner part of a grape.

C. Flour is an ingredient of bread, not its inner part.

D. Soil is the medium a seed grows in, not its inner part.

Question 9 English

Four lettered pairs (A to D) follow a related pair of words given in capitals. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair in capitals. TACTILE: TOUCH::

- A. audible: volume
- B. nasal: smell
- C. sensitive: feeling ✓ **Correct answer**
- D. visible: sight

A. "Audible" relates to hearing, not to touch, and "volume" is loudness, not the sense.

B. "Nasal" relates to the nose and "smell" is the sense, a parallel sense pair, but the

nk answer for this exact item is C.

C. "Sensitive" relates to feeling (the sense of touch) exactly as "tactile" relates to touch; this is the standard bank answer for this item.

D. "Visible" relates to sight, another parallel sense pair, but not the standard bank answer for this item.

Note: Note: B and D are also structurally parallel sense pairs; C is the intended answer (decided by assistant under owner's 8 Nov delegation).

Question 10 English

Four lettered pairs (A to D) follow a related pair of words given in capitals. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair in capitals. ANALGESIC: PAIN::

- A. antiseptic: cleanliness
- B. tranquilizer: anxiety ✓ **Correct answer**
- C. sedative: sleep
- D. antibiotic: medicine

A. An antiseptic prevents infection, it does not produce cleanliness as a relieved condition.

B. An analgesic relieves pain, just as a tranquilizer relieves anxiety; both are remedy : condition relieved.

C. A sedative induces sleep rather than relieving a condition called sleep.

D. An antibiotic is a kind of medicine, not a remedy for a condition named "medicine".

Question 11 Physics

A force of 200 N acts on a body of mass 20 kg. The force accelerates the body from rest until it attains a velocity of 50 m/s. Through what distance the force acts?

m

- B. 125 m ✓ **Correct answer**
- C. 130 m
- D. 145 m

A. Acceleration a = F/m = 200/20 = 10 m/s^2; v^2 = 2as gives s = 2500/20 = 125 m, not 120 m.

B. a = 200/20 = 10 m/s^2; s = v^2/(2a) = 50^2/(2 x 10) = 2500/20 = 125 m.

C. 130 m does not satisfy v^2 = 2as with a = 10 m/s^2.

D. 145 m does not satisfy v^2 = 2as with a = 10 m/s^2.

Question 12 Physics

The number of perpendicular components of a force in cartesian co-ordinate system are:

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

A. A force in three-dimensional Cartesian space has three perpendicular components, not one.

B. Two components are enough only in a plane (two dimensions).

C. In a three-dimensional Cartesian system a vector resolves into three mutually perpendicular components (x, y, z).

D. There are three spatial dimensions, so there is no fourth perpendicular component.

Question 13 Physics

Mass of earth can be calculated on the _____ law.

- B. Newton's law of gravitation ✓ **Correct answer**
- C. Coulomb's law
- D. Ampere's law

A. F = ma relates force, mass and acceleration but does not give the Earth's mass.

B. From g = GM/R^2, the Earth's mass M = gR^2/G, so the law of gravitation gives the Earth's mass.

C. Coulomb's law governs electric charges, not the Earth's mass.

D. Ampere's law governs magnetic fields from currents, not the Earth's mass.

Question 14 Physics

A body is said to be in neutral equilibrium, if its centre of gravity:

- A. is at its highest position
- B. is at its lowest position
- C. maintains its height after being displaced ✓ **Correct answer**
- D. is situated at its bottom

A. The centre of gravity at its highest position is unstable equilibrium.

B. The centre of gravity at its lowest position is stable equilibrium.

C. In neutral equilibrium a displaced body stays in its new position, so its centre of gravity keeps the same height.

D. The position of the centre of gravity relative to the bottom does not define neutral equilibrium.

Question 15 Physics

Fossil fuels energy includes:

ır energy

- B. Wind
- C. Coal, petrol and gas ✓ **Correct answer**
- D. Hydro-electric

A. Solar energy comes from the Sun, not from fossil fuels.

B. Wind energy comes from moving air, not from fossil fuels.

C. Coal, petroleum and natural gas are the fossil fuels, formed from ancient organic matter.

D. Hydro-electric energy comes from flowing water, not from fossil fuels.

Question 16 Physics

A car weighing 12 kN has speed of 20 m/s take g=10m/s^2. Its kinetic energy is:

- A. 241 kJ
- B. 245 kJ
- C. 240 kJ ✓ **Correct answer**
- D. 246 kJ

A. Mass m = 12000/10 = 1200 kg; KE = 1/2 x 1200 x 20^2 = 240,000 J = 240 kJ, not 241 kJ.

B. 1/2 x 1200 x 400 = 240,000 J, not 245 kJ.

C. m = W/g = 12000/10 = 1200 kg; KE = 1/2 mv^2 = 1/2 x 1200 x 400 = 240,000 J = 240 kJ.

D. 1/2 x 1200 x 400 = 240,000 J, not 246 kJ.

Question 17 Physics

A body of mass 50 kg is raised to a height of 3 m take g=10m/s^2. What is its potential energy?

- A. 1100 J

0 J

- C. 1600 J
- D. 1500 J ✓ **Correct answer**

A. PE = mgh = 50 x 10 x 3 = 1500 J, not 1100 J.

B. 50 x 10 x 3 = 1500 J, not 1400 J.

C. 50 x 10 x 3 = 1500 J, not 1600 J.

D. PE = mgh = 50 x 10 x 3 = 1500 J.

Question 18 Physics

A force of 100 N is applied perpendicularly on a spanner at a distance of 10 cm from a nut. The torque produced by the force is:

- A. 5 Nm
- B. 6 Nm
- C. 10 Nm ✓ **Correct answer**
- D. 50 Nm

A. Torque = force x perpendicular distance = 100 x 0.10 = 10 Nm, not 5 Nm.

B. 100 x 0.10 = 10 Nm, not 6 Nm.

C. Torque = F x d = 100 N x 0.10 m = 10 Nm.

D. 100 x 0.10 = 10 Nm, not 50 Nm.

Question 19 Physics

The minimum number of forces that can be added using head to tail rule are:

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

A. The head-to-tail rule adds vectors, and adding needs at least two vectors; a single force has nothing to be added to.

B. Three forces can be added, but the minimum is two.

C. Four forces can be added, but the minimum is two.

D. Five forces can be added, but the minimum is two.

Question 20 Physics

The distance between the centers of the spheres is 0.5 m. Then the gravitation force of attraction between two spheres each of mass 1000 kg is:

- A. 3.57 x 10^-4 N
- B. 4.31 x 10^-4 N
- C. 5.61 x 10^-4 N
- D. 2.67 x 10^-4 N ✓ **Correct answer**

A. F = G m1 m2 / r^2 = 6.67 x 10^-11 x 10^6 / 0.25 = 2.67 x 10^-4 N, not 3.57 x 10^-4 N.

B. 6.67 x 10^-11 x 10^6 / 0.25 = 2.67 x 10^-4 N, not 4.31 x 10^-4 N.

C. 6.67 x 10^-11 x 10^6 / 0.25 = 2.67 x 10^-4 N, not 5.61 x 10^-4 N.

D. F = G m1 m2 / r^2 = 6.67 x 10^-11 x 1000 x 1000 / (0.5)^2 = 6.67 x 10^-11 x 4 x 10^6 = 2.67 x 10^-4 N.

Question 21 Physics

Water has maximum density at:

- A. 0°C
- B. 4°C ✓ **Correct answer**
- C. 37°C

A. At 0°C water is about to freeze and is less dense than at 4°C.

B. Water is densest at 4°C (the anomalous expansion of water).

C. 37°C is normal human body temperature, not water's maximum-density temperature.

D. At 100°C water boils; its density is much lower than at 4°C.

Question 22 Physics

In the Einstein's mass energy equation, 'c' is the:

- A. Speed of sound
- B. Speed of electron
- C. Speed of Earth
- D. Speed of light ✓ **Correct answer**

A. In E = mc^2, c is not the speed of sound.

B. In E = mc^2, c is not the speed of an electron.

C. In E = mc^2, c is not the speed of the Earth.

D. In E = mc^2, c is the speed of light in vacuum (3 x 10^8 m/s).

Question 23 Physics

A stone of mass 500g strikes the ground with a velocity of 20 m/s. How much is the kinetic energy of the stone at the time it strikes the ground?

- A. 110 J
- B. 100 J ✓ **Correct answer**
- C. 115 J
- D. 150 J

0.5 x 20^2 = 100 J, not 110 J.

B. KE = 1/2 mv^2 = 1/2 x 0.5 kg x (20 m/s)^2 = 1/2 x 0.5 x 400 = 100 J.

C. 1/2 x 0.5 x 400 = 100 J, not 115 J.

D. 1/2 x 0.5 x 400 = 100 J, not 150 J.

Question 24 Physics

"The rate of change in momentum is equal to applied force", this statement is called:

- A. Boyle's law
- B. Ohm's law
- C. Newton's second law of motion ✓ **Correct answer**
- D. Coulomb's law

A. Boyle's law relates the pressure and volume of a gas, not momentum.

B. Ohm's law relates voltage, current and resistance, not momentum.

C. Newton's second law states that the rate of change of momentum is directly proportional to the applied force (F = dp/dt).

D. Coulomb's law governs the force between electric charges, not momentum.

Question 25 Physics

Two equal but unlike parallel forces having different line of action producing rotation, defines:

- A. A Torque
- B. A Couple ✓ **Correct answer**
- C. Equilibrium
- D. Neutral

A. Torque is the turning effect of a single force about a point, not the pair of forces itself.

, opposite, parallel forces with different lines of action form a couple, which produces pure rotation.

C. Equilibrium means the body is at rest or in uniform motion, not this pair of forces.

D. "Neutral" alone does not name this pair of forces.

Question 26 Physics

The rate of displacement is called:

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

A. Acceleration is the rate of change of velocity, not of displacement.

B. Velocity is defined as the rate of displacement (displacement per unit time).

C. Speed is the rate of distance (a scalar), not the rate of displacement (a vector).

D. Force is mass times acceleration, not the rate of displacement.

Question 27 Physics

A body is said to be in equilibrium, when its:

- A. acceleration is uniform
- B. speed is uniform
- C. speed and acceleration are uniform
- D. acceleration is zero ✓ **Correct answer**

A. Uniform (non-zero) acceleration means a net force acts, so the body is not in equilibrium.

B. Uniform speed alone does not guarantee equilibrium (e.g. uniform circular motion has

C. Uniform acceleration means a net force acts, so the body is not in equilibrium.

D. A body is in equilibrium when the net force is zero, i.e. its acceleration is zero (at rest or in uniform motion).

Question 28 Physics

A man has pulled a cart through 35 m applying a force of 300 N. The work done by the man is:

- A. 10400 J
- B. 10600 J
- C. 10500 J ✓ **Correct answer**
- D. 10700 J

A. Work = force x distance = 300 x 35 = 10,500 J, not 10,400 J.

B. 300 x 35 = 10,500 J, not 10,600 J.

C. Work = F x d = 300 N x 35 m = 10,500 J.

D. 300 x 35 = 10,500 J, not 10,700 J.

Question 29 Physics

Normal human body temperature is:

- A. 15°C
- B. 37°C ✓ **Correct answer**
- C. 99.6°C
- D. 98.6°C

A. 15°C is far below normal body temperature.

B. Normal human body temperature is 37°C (98.6°F).

near boiling point and would be fatal.

D. 98.6 is the Fahrenheit figure (98.6°F = 37°C); as a Celsius value it is wrong.

Question 30 Physics

Which is not a unit of power?

- A. Horse power
- B. British thermal unit
- C. Watt
- D. Newton-meter ✓ **Correct answer**

A. Horsepower is a unit of power.

B. The British thermal unit is strictly a unit of heat energy, not power, so it is also defensible here; the standard bank answer for this item is D.

C. The watt is the SI unit of power.

D. A newton-meter is a joule, a unit of work/energy (or torque), not a unit of power; this is the standard bank answer (decided by assistant under owner's 8 Nov delegation; B is the only other defensible option).

Question 31 Physics

If the mass of mars is 6.42x10^23 kg, and its radius is 3370 km. Then the acceleration due to gravity on the surface of the mars is:

- A. 3.77 ms^-2 ✓ **Correct answer**
- B. 4.77 ms^-2
- C. 8.71 ms^-2
- D. 9.73 ms^-2

A. g = GM/R^2 = 6.67 x 10^-11 x 6.42 x 10^23 / (3.37 x 10^6)^2 = 4.28 x 10^13 / 1.136 x 10^13 = 3.77 m/s^2.

-11 x 6.42 x 10^23 / (3.37 x 10^6)^2 = 3.77 m/s^2, not 4.77 m/s^2.

C. 3.77 m/s^2, not 8.71 m/s^2.

D. 9.73 m/s^2 is near the Earth's value, not Mars'.

Note: Note: The stem is split across the page in the print ("If the mass of mars is 6.42x10^23" / "31. kg, and its radius is 3370 km.").

Question 32 Physics

Twinkling of stars, formation of mirage are due to:

- A. Diffraction
- B. Refraction only ✓ **Correct answer**
- C. Total internal reflection
- D. Reflection only

A. Diffraction is the bending of waves around obstacles; it does not cause twinkling or mirage.

B. Twinkling is caused by refraction of starlight through air layers of varying density, and mirage is explained by refraction through layers of hot and cool air; the standard bank answer is refraction.

C. Total internal reflection is the mechanism within a mirage, but twinkling is refraction, so this alone does not cover both.

D. Neither twinkling nor mirage is caused by ordinary reflection.

Question 33 Physics

The numerical value of universal constant of gravitation in SI units is:

- A. 6.683x10^-11 Nm2kg^-2
- B. 6.673x10^-11 Nm2kg^-2 ✓ **Correct answer**

- D. 6.3x10^-11 Nm2kg^-2

A. The CODATA/textbook value is 6.673 x 10^-11 (modern value 6.674 x 10^-11), not 6.683.

B. G = 6.673 x 10^-11 Nm^2kg^-2 is the standard textbook value of the universal gravitational constant.

C. 5.673 x 10^-11 is not the value of G.

D. 6.3 x 10^-11 is not the value of G.

Question 34 Physics

The arrangement used for stepping up and stepping down the voltage is known as:

- A. Voltmeter
- B. Galvanometer
- C. Ammeter
- D. Transformer ✓ **Correct answer**

A. A voltmeter measures voltage; it does not change it.

B. A galvanometer detects small currents; it does not change voltage.

C. An ammeter measures current; it does not change voltage.

D. A transformer steps alternating voltage up or down by electromagnetic induction.

Question 35 Physics

A force is acting on a body making an angle of 30° with the horizontal. The horizontal component of the force is 20 N. The force is:

- A. 26.9 N
- B. 24.8 N
- C. 43.9 N

N ✓ Correct answer

A. F = 20/cos30° = 20/0.866 = 23.1 N, not 26.9 N.

B. 20/0.866 = 23.1 N, not 24.8 N.

C. 20/0.866 = 23.1 N, not 43.9 N.

D. Horizontal component = F cos30°, so F = 20/cos30° = 20/0.866 = 23.1 N.

Question 36 Physics

The unit capacity of capacitor is:

- A. Newton
- B. Joule
- C. Ampere
- D. Farad ✓ **Correct answer**

A. The newton is the unit of force, not capacitance.

B. The joule is the unit of energy, not capacitance.

C. The ampere is the unit of current, not capacitance.

D. The farad is the SI unit of capacitance.

Question 37 Physics

The reciprocal of frequency is called:

- A. Wave length (λ)
- B. Time period (T) ✓ **Correct answer**
- C. Compression
- D. Anti-node

A. Wavelength is the distance of one complete wave, not the reciprocal of frequency.

od $T = 1/f$, the reciprocal of frequency.

C. A compression is a region of high pressure in a longitudinal wave, not the reciprocal of frequency.

D. An anti-node is a point of maximum amplitude in a stationary wave, not the reciprocal of frequency.

Question 38 Physics

A couple is formed by:

- A. two forces perpendicular two each other
- B. two like parallel forces
- C. two equal and opposite forces not in the same line of action ✓ **Correct answer**
- D. two equal and opposite forces in the same line

A. Two perpendicular forces do not form a couple; a couple needs parallel forces.

B. Two like (same-direction) parallel forces do not form a couple; they add up to a single force.

C. A couple is exactly two equal, opposite, parallel forces whose lines of action differ, producing pure rotation.

D. Two equal and opposite forces in the same line cancel each other and produce no rotation.

Question 39 Physics

A block weighing 20 N is lifted 6 m vertically upward. The potential energy stored in it is:

- A. 120 J ✓ **Correct answer**
- B. 115 J
- C. 125 J
- D. 110 J

nt x height = 20 N x 6 m = 120 J.

B. 20 x 6 = 120 J, not 115 J.

C. 20 x 6 = 120 J, not 125 J.

D. 20 x 6 = 120 J, not 110 J.

Question 40 Physics

Racing cars are made stable by:

- A. increasing their speed
- B. decreasing their mass
- C. increasing their mass
- D. lowering their centre of gravity ✓ **Correct answer**

A. Higher speed makes a car less stable, not more.

B. Lower mass alone does not stabilise a car.

C. Greater mass alone does not stabilise a car.

D. A low centre of gravity makes a car harder to overturn, which is why racing cars are built low.

Question 41 Chemistry

The most suitable mode chemical reaction for an atom having electronic configuration of 4d10, 5s2, 5p5, is:

- A. Redox reaction ✓ **Correct answer**
- B. Substitution reaction
- C. Addition reaction
- D. Endothermic reaction

A. The configuration 4d10 5s2 5p5 is iodine, a halogen one electron short of a full octet,

characteristically act as oxidising agents in redox reactions.

B. Substitution is characteristic of saturated organic compounds, not of a halogen atom one electron short of an octet.

C. Addition is characteristic of unsaturated compounds, not the characteristic reaction mode of a halogen atom.

D. "Endothermic" describes heat flow, not a reaction mode for this atom.

Question 42 Chemistry

The most stable electronic configuration for Chromium atom, can be proposed as:

- A. 3d5, 5s2
- B. 3d5, 4s1 ✓ **Correct answer**
- C. 3d4, 4s1
- D. 3d5, 4s2

A. Chromium's outer shell is the 4s shell, not 5s.

B. Chromium is [Ar] 3d5 4s1: the half-filled 3d subshell (five unpaired electrons) is extra stable, so one 4s electron moves to 3d.

C. 3d4 4s1 would be the unshifted configuration, but the half-filled 3d5 arrangement is more stable.

D. 3d5 4s2 has six valence electrons, one more than chromium's 24 electrons allow in that arrangement.

Question 43 Chemistry

Salt that can develop a basic solution on dissolution in water, is:

- A. Sodium carbonate ✓ **Correct answer**
- B. Sodium chloride

per sulphate

- D. Ammonium chloride

A. Sodium carbonate is the salt of a strong base (NaOH) and a weak acid (H2CO3); it hydrolyses to give a basic solution.

B. Sodium chloride is the salt of a strong acid and a strong base; its solution is neutral.

C. Copper sulphate is the salt of a strong acid and a weak base; its solution is acidic.

D. Ammonium chloride is the salt of a strong acid and a weak base; its solution is acidic.

Question 44 Chemistry

High percentage of ionic character results into the highest value of dipole moment in:

- A. Hydrogen fluoride ✓ **Correct answer**
- B. Hydrogen chloride
- C. Sulphur dioxide
- D. Hydrogen disulphide

A. HF has the highest ionic character among the hydrogen halides (fluorine is the most electronegative element) and the highest dipole moment (1.91 D, against 1.08 D for HCl).

B. HCl has less ionic character and a smaller dipole moment than HF.

C. SO2 has a smaller dipole moment than HF and is not a hydrogen halide.

D. H2S2 is not the compound with the highest ionic character or dipole moment here.

Question 45 Chemistry

Formation of Line spectrum, can be expected from:

- A. Sodium ion
- B. Sodium cation
- C. Sodium chloride molecule
- D. Molecule

ium atom ✓ **Correct answer**

A. A sodium ion (Na+) has no valence electron to be excited and emit a line spectrum.

B. A sodium cation is the same as a sodium ion; it has no valence electron for line emission.

C. A molecule gives band spectra, not the sharp line spectrum of an atom.

D. A neutral sodium atom has a valence electron whose transitions give the characteristic yellow line spectrum (the sodium D-lines).

Question 46 Chemistry

By adding potassium hydroxide into the aqueous solution of potassium chloride, the ionization of potassium chloride will:

- A. remain unchanged
- B. decrease ✓ **Correct answer**
- C. increase
- D. become unpredictable

A. Adding a common ion changes the ionisation; it does not leave it unchanged.

B. KOH supplies K+ ions, the common ion with KCl; by the common-ion effect the ionisation of KCl is suppressed, so it decreases.

C. A common ion suppresses ionisation, it does not increase it.

D. The common-ion effect predicts the change (a decrease), so it is not unpredictable.

Question 47 Chemistry

Passing of hydrogen sulphide through aqueous solution sulphuric acid, will:

- A. not affect the ionization of sulphuric acid
- B. decrease the ionization of sulphuric acid ✓ **Correct answer**

ease the ionization of sulphuric acid

- D. solidify the hydrogen sulphide gas

A. H2S supplies H+ ions, a common ion, so it does affect the ionisation.

B. H2S is a weak acid that supplies H+ ions; by the common-ion effect the ionisation of H2SO4 is suppressed.

C. A common ion suppresses ionisation, it does not increase it.

D. Passing H2S gas through the acid does not solidify it.

Question 48 Chemistry

Lowest value of bond length will be observed in case of bond formation, through:

- A. dsp3-hybridization
- B. sp3-hybridization
- C. sp2-hybridization
- D. sp-hybridization ✓ **Correct answer**

A. dsp3 hybridisation (trigonal bipyramidal) does not give the shortest bonds.

B. sp3 bonds (single bonds) have the most p-character and the longest bond length of the three.

C. sp2 bonds (double bonds) are shorter than sp3 but longer than sp.

D. sp hybridisation gives the most s-character (50%), the strongest and shortest bonds (triple bonds).

Question 49 Chemistry

The highest value of bond dissociation energy is associated with the bond, formed by

- A. dsp3-hybridization
- B. sp3-hybridization

-hybridization

- D. sp-hybridization ✓ **Correct answer**

A. dsp3 hybridisation does not give the highest bond dissociation energy.

B. sp3 single bonds have the lowest bond dissociation energy of the three.

C. sp2 double bonds are stronger than sp3 but weaker than sp triple bonds.

D. sp hybridisation gives triple bonds, which have the highest bond dissociation energy.

Question 50 Chemistry

Addition of hydrochloric acid into concentrated solution of acetic acid, results in:

- A. decreased chloride ion concentration
- B. decreased acetate ion concentration ✓ **Correct answer**
- C. increased acetate ion concentration
- D. increased alkalinity of solution

A. Adding HCl adds chloride ions, so the chloride concentration increases, not decreases.

B. HCl supplies H+ ions, the common ion with acetic acid; by the common-ion effect the ionisation of CH3COOH is suppressed, so the acetate ion concentration decreases.

C. The common-ion effect suppresses acetic acid ionisation, so acetate decreases, not increases.

D. Adding a strong acid makes the solution more acidic, not more alkaline.

Question 51 Chemistry

Addition of 500 cm3 of dilute solution of nitric acid into 1000 cm3 of buffer solution having pH = 3, will result into the solution having pH:

- A. Equal to 7
- B. Equal to 5

- D. Less than 3 ✓ **Correct answer**

A. Adding acid to an acidic buffer cannot make it neutral (pH 7).

B. Adding acid lowers the pH; it cannot raise it from 3 to 5.

C. Adding acid lowers the pH, it cannot raise it above 5.

D. Adding nitric acid to a buffer of pH 3 adds H+ ions, so the pH falls slightly below 3 (the buffer resists a large change but does not prevent a small fall).

Question 52 Chemistry

Non-directional overlapping of atomic orbitals is entirely responsible for stable molecular geometry of:

- A. Water
- B. Nitrogen
- C. Methane ✓ **Correct answer**
- D. Methanol

A. Water's bent geometry comes from directional sp3 hybridisation and lone pairs, not from non-directional overlap alone.

B. Nitrogen (N2) is a diatomic molecule whose triple bond is formed by directional p-p overlap; it has no molecular geometry explained by non-directional overlap.

C. Methane is the textbook example in the overlap discussion: its stable tetrahedral geometry is explained by the overlapping of the carbon atom's orbitals with the hydrogen 1s orbitals (the s-orbital part of the overlap being non-directional); this is the intended bank answer.

D. Methanol's geometry involves directional bonds and a lone pair on oxygen, not non-directional overlap alone.

The question's wording is loose, since sp3 hybrid overlap is directional; C is the intended answer (decided by assistant under owner's 8 Nov delegation; B is the handwritten key's answer but has no defensible basis).

Question 53 Chemistry

In order to form stable molecular geometry of phosphorous pentachloride, central atom will undergo:

- A. dsp3-hybridization ✓ **Correct answer**
- B. sp3-hybridization
- C. sp2-hybridization
- D. sp-hybridization

A. PCl5 is trigonal bipyramidal, which requires five hybrid orbitals: phosphorus uses one d, one s and three p orbitals (dsp3).

B. sp3 gives four orbitals (tetrahedral), too few for five P-Cl bonds.

C. sp2 gives three orbitals (trigonal planar), too few for five P-Cl bonds.

D. sp gives two orbitals (linear), too few for five P-Cl bonds.

Question 54 Chemistry

In oxygen molecule, a π-bond is formed by:

- A. s-s overlap
- B. s-p overlap parallel
- C. p-p head-on overlap
- D. p-p parallel overlap ✓ **Correct answer**

A. s-s overlap forms a sigma bond, not a pi bond.

B. s-p overlap forms a sigma bond, not a pi bond.

on overlap forms a sigma bond.

D. A pi bond is formed by the side-by-side (parallel) overlap of two p orbitals.

Question 55 Chemistry

When 2 cm3 dilute solution of sodium hydroxide is added into 100 ml of a buffer solution of pH=8, pH of the resulted solution will:

- A. Become less than 8
- B. Become greater than 8 ✓ **Correct answer**
- C. Remain unchanged
- D. Become unpredictable

A. Adding a base (NaOH) cannot lower the pH.

B. Adding NaOH adds OH- ions, so the pH rises slightly above 8; a buffer resists a large change but does not freeze the pH exactly.

C. "Remain unchanged" is the textbook slogan for buffer action, but the pH does shift slightly when base is added; it is not exactly unchanged.

D. The direction of the change (a slight rise) is predictable, so it is not unpredictable.

Note: Note: B is the scientifically exact answer; C is the slogan answer (decided by assistant under owner's 8 Nov delegation).

Question 56 Chemistry

Magnesium atom can be made isoelectronic to Neon atom, through the process of:

- A. Sublimation
- B. Neutralization
- C. Configuration
- D. Oxidation ✓ **Correct answer**

ion is a change of state (solid to gas); it does not change the electron count.

B. Neutralisation is an acid-base reaction; it does not remove electrons from magnesium.

C. "Configuration" is not a process that changes the electron count.

D. Oxidation is the loss of electrons: Mg loses two electrons to become Mg2+, which has 10 electrons, isoelectronic with neon.

Question 57 Chemistry

Addition of dilute solution of hydrochloric acid into the dilute solution of barium hydroxide, will results:

- A. increased concentration of hydroxide ions
- B. increased concentration of hydrogen ions ✓ **Correct answer**
- C. formation of white precipitates
- D. formation of black precipitates

A. Adding acid neutralises hydroxide ions, so their concentration decreases, not increases.

B. Adding HCl to Ba(OH)2 raises the hydrogen-ion concentration (the acid's H+ ions remain in excess of the very low H+ of the basic solution) as neutralisation proceeds.

C. The product, barium chloride, is soluble in water, so no white precipitate forms.

D. No black precipitate forms in this neutralisation.

Question 58 Chemistry

Specie having the highest number of unpaired electron, is:

- A. Chlorine
- B. Phosphorous ✓ **Correct answer**
- C. Carbon
- D. Boron

3s2 3p5) has one unpaired electron.

B. Phosphorus (3s2 3p3) has three unpaired electrons, the most of the four.

C. Carbon (2s2 2p2) has two unpaired electrons.

D. Boron (2s2 2p1) has one unpaired electron.

Question 59 Chemistry

A species having an electronic configuration of 2s2, 2p5, will most probably will undergo a/an:

- A. Endergonic reaction
- B. Exergonic reaction ✓ **Correct answer**
- C. Substitution reaction
- D. Addition reaction

A. An endergonic reaction absorbs energy; a species one electron short of a full octet (fluorine) reacts by releasing energy, not absorbing it.

B. The configuration 2s2 2p5 is fluorine, the most reactive element; its reactions are strongly energy-releasing (exergonic).

C. Substitution is not the characteristic reaction of a bare fluorine atom.

D. Addition is a reaction type for unsaturated compounds, not the characteristic description of fluorine's reactivity.

Question 60 Chemistry

In nitrogen molecule, the very first bond is generally formed by:

- A. s-s overlap
- B. s-p overlap
- C. p-p head-on overlap ✓ **Correct answer**

parallel overlap

A. The N-N bond is formed by p orbitals, not by s-s overlap.

B. The N-N bond is formed by p-p overlap, not s-p overlap.

C. The first (sigma) bond in N2 is formed by the head-on overlap of two p orbitals along the internuclear axis.

D. p-p parallel (side-by-side) overlap forms the pi bonds, which come after the sigma bond.

Question 61 Chemistry

Paramagnetic behavior of substances, is mainly dependent upon the presence of:

- A. Degenerate atomic orbitals
- B. Degenerate molecular orbitals
- C. Unpaired electrons ✓ **Correct answer**
- D. High energy electrons

A. Degenerate orbitals alone do not cause paramagnetism; they must contain unpaired electrons.

B. Degenerate molecular orbitals alone do not cause paramagnetism.

C. Paramagnetism is caused by unpaired electrons, whose magnetic moments align with an applied field.

D. High-energy electrons alone do not cause paramagnetism.

Question 62 Chemistry

Energy of an electron can be predicted by the useful information provided by:

- A. Magnetic quantum number
- B. Spin quantum number

- D. Principal quantum number ✓ **Correct answer**

A. The magnetic quantum number gives the orientation of an orbital, not the electron's energy.

B. The spin quantum number gives the electron's spin direction, not its energy.

C. The azimuthal quantum number gives the orbital's shape (subshell), not the principal energy.

D. The principal quantum number (n) determines the energy level (shell) of the electron, and hence its energy.

Question 63 Chemistry

Primary alcohol of choice to form Iodoform through haloform reaction mechanism, is:

- A. Methanol
- B. Ethanol ✓ **Correct answer**
- C. Phenol
- D. 2-methyl-2-propanol

A. Methanol has no CH3-CH(OH)- group, so it cannot form iodoform.

B. Ethanol (CH3CH2OH) has the CH3-CH(OH)- group and gives iodoform (CHI3) with iodine and alkali; it is the only primary alcohol that does.

C. Phenol is not a primary alcohol and does not give iodoform by the haloform reaction.

D. 2-methyl-2-propanol is a tertiary alcohol with no CH3-CH(OH)- group, so it cannot form iodoform.

Question 64 Chemistry

Degree of ionization of an electrolyte generally decreases, by:

easing dilution

- B. increasing concentration ✓ **Correct answer**
- C. increasing temperature
- D. decreasing volume

A. Dilution increases the degree of ionisation (Ostwald's dilution law), not decreases it.

B. Increasing the concentration decreases the degree of ionisation of a weak electrolyte.

C. Increasing temperature generally increases ionisation, not decreases it.

D. Decreasing the volume (increasing concentration) would decrease ionisation, but the direct statement is B; decreasing volume is the same effect expressed indirectly, and the standard answer is increasing concentration.

Question 65 Chemistry

Passing of hydrogen sulphide gas through dilute solution of acetic acid will result into:

- A. decreased ionization of acetic acid ✓ **Correct answer**
- B. increased ionization of acetic acid
- C. bubbling effervescence in solution
- D. precipitation of hydrogen sulphide

A. H2S supplies H+ ions, the common ion with acetic acid; by the common-ion effect the ionisation of CH3COOH is suppressed.

B. A common ion suppresses ionisation, it does not increase it.

C. Passing H2S gas through the solution does not produce effervescence (no gas is evolved).

D. Hydrogen sulphide is a gas; it does not precipitate from the solution.

66 Chemistry

For having five degenerate atomic orbitals, an atom must possess the value of Azimuthal quantum number as equal to:

- A. 0
- B. 1
- C. 2 ✓ **Correct answer**
- D. 3

A. l = 0 is the s subshell, which has one orbital.

B. l = 1 is the p subshell, which has three orbitals.

C. l = 2 is the d subshell, which has five degenerate orbitals.

D. l = 3 is the f subshell, which has seven orbitals.

Question 67 Chemistry

In order to form a stable molecular geometry, central atom of aluminium chloride, will undergo:

- A. dsp3-hybridization
- B. sp3-hybridization
- C. sp2-hybridization ✓ **Correct answer**
- D. sp-hybridization

A. dsp3 gives five orbitals (trigonal bipyramidal); AlCl3 needs three.

B. sp3 gives four orbitals (tetrahedral); AlCl3 is trigonal planar with three bonds.

C. AlCl3 is trigonal planar, which requires three sp2 hybrid orbitals on aluminium.

D. sp gives two orbitals (linear); AlCl3 needs three.

68 Chemistry

Spherically symmetrical orbital will become the outermost orbital, when two electrons are removed from:

- A. Silicon atom ✓ **Correct answer**
- B. Sodium ion
- C. Chloride ion
- D. Phosphorous atom

A. Silicon is [Ne] 3s2 3p2; removing two electrons removes the 3p electrons, leaving 3s2 as the outermost orbital — and the s orbital is spherically symmetrical.

B. Na+ is 1s2 2s2 2p6; removing two electrons leaves 2p4 as the outermost orbital, which is not spherical.

C. Cl- is [Ne] 3s2 3p6; removing two electrons leaves 3p4 as the outermost orbital, which is not spherical.

D. Phosphorus is [Ne] 3s2 3p3; removing two electrons leaves 3p1 as the outermost orbital, which is not spherical.

Question 69 Chemistry

Methane molecule has zero dipole moment, mainly because:

- A. Every bond in methane is non-polar
- B. Molecular geometry of methane is tetrahedral ✓ **Correct answer**
- C. All bond lengths in methane are equal
- D. All bonds in methane are formed by s-s overlap

A. C-H bonds have a small polarity (carbon is slightly more electronegative than hydrogen), so this is factually wrong.

B. Methane's four C-H bond dipoles point to the corners of a regular tetrahedron and cancel exactly, giving zero net dipole moment.

d lengths alone do not cancel dipole moments; the symmetrical tetrahedral arrangement does.

D. The C-H bonds are formed by sp3 hybrid orbitals overlapping with hydrogen 1s orbitals, not by s-s overlap.

Question 70 Chemistry

In the presence of a strong electric field, spectral line of an atom will split up producing:

- A. Photoelectric effect
- B. Zeeman's effect
- C. Deterioration effect
- D. Stark effect ✓ **Correct answer**

A. The photoelectric effect is the emission of electrons by light, not the splitting of spectral lines.

B. The Zeeman effect is the splitting of spectral lines in a magnetic field, not an electric field.

C. There is no "deterioration effect" for spectral-line splitting.

D. The Stark effect is the splitting of spectral lines in a strong electric field.

Question 71 Botany & Zoology

Which of the following has a clitellum?

- A. Earthworm ✓ **Correct answer**
- B. Neries
- C. Cockroach
- D. Flatworm

A. The earthworm has a clitellum, the thickened glandular band used in cocoon formation.

marine polychaete) has no clitellum.

C. The cockroach, an insect, has no clitellum.

D. Flatworms have no clitellum.

Question 72 Botany & Zoology

Double fertilization in angiosperm was discovered by:

- A. Leeuwenhoek
- B. Strasburger
- C. Hofmeister
- D. Nawaschin S.G. ✓ **Correct answer**

A. Leeuwenhoek discovered microorganisms and spermatozoa, not double fertilisation.

B. Strasburger worked on cell division and fertilisation in plants, but double fertilisation was discovered by Nawaschin.

C. Hofmeister discovered the alternation of generations, not double fertilisation.

D. Sergei G. Nawaschin discovered double fertilisation in angiosperms in 1898.

Question 73 Botany & Zoology

Ringworm disease in man is caused by:

- A. Trichosporon
- B. Aspergillus
- C. Sporobolomycus
- D. Microsporum ✓ **Correct answer**

A. Trichosporon causes white piedra (hair infection), not ringworm.

B. Aspergillus causes aspergillosis, not ringworm.

omyces is a yeast-like fungus, not a cause of ringworm.

D. Microsporum is a dermatophyte genus that causes ringworm (tinea).

Question 74 Botany & Zoology

The common phase between aerobic and anaerobic respiration is called:

- A. Tricarboxylic acid cycle
- B. Oxidative phosphorylation
- C. Embden Meyerhof-Parnas pathway or Glycolysis ✓ **Correct answer**
- D. Kreb's cycle

A. The TCA (Krebs) cycle occurs only in aerobic respiration, not in anaerobic respiration.

B. Oxidative phosphorylation occurs only in aerobic respiration.

C. Glycolysis (the EMP pathway) is the first stage of both aerobic and anaerobic respiration, so it is the common phase.

D. The Krebs cycle occurs only in aerobic respiration, not in anaerobic respiration.

Question 75 Botany & Zoology

4th ventricle is present in:

- A. Optic lobes
- B. Diencephalon
- C. Medulla oblongata ✓ **Correct answer**
- D. Brainstem structure

A. The optic lobes are part of the midbrain; the 4th ventricle is not in them.

B. The diencephalon contains the 3rd ventricle, not the 4th.

C. The 4th ventricle lies dorsal to the pons and the upper medulla oblongata; the standard answer is the medulla oblongata.

n structure" is too vague, the specific answer is the medulla oblongata.

Question 76 Botany & Zoology

Phyllode is a modified:

- A. Leaf
- B. Petiole ✓ **Correct answer**
- C. Stem
- D. Branch

A. A phyllode is not a whole modified leaf; it is specifically the flattened petiole acting as a leaf.

B. A phyllode is a flattened, leaf-like petiole (e.g. in Australian Acacia) that carries out photosynthesis.

C. A modified stem acting as a leaf is a phylloclade, not a phyllode.

D. A phyllode is not a modified branch.

Question 77 Botany & Zoology

The cauliflower used as a vegetable is:

- A. A bunch of fertile flowers
- B. An undifferentiated compaction of leaves
- C. A fleshy inflorescence ✓ **Correct answer**
- D. None of the above

A. The cauliflower head is made of immature flower buds, not a bunch of fertile flowers.

B. The cauliflower head is not compacted leaves.

C. The edible cauliflower curd is a fleshy, condensed inflorescence of unopened flower buds.

s correct, so "None of the above" is wrong.

Question 78 Botany & Zoology

Which one factor has led to some cichlid extinction in the lake:

- A. Over fishing
- B. Agricultural run off
- C. Waste
- D. All of the above ✓ **Correct answer**

A. Overfishing is one of the factors behind cichlid declines, but it is not the only one.

B. Agricultural run-off (nutrient pollution) is one of the factors behind cichlid declines, but it is not the only one.

C. Waste pollution is one of the factors behind cichlid declines, but it is not the only one.

D. Overfishing, agricultural run-off and waste together have driven cichlid extinctions (notably in Lake Victoria).

Question 79 Botany & Zoology

The Pellicle is present in:

- A. Amoeba Verrucosa ✓ **Correct answer**
- B. Amoeba Proteus
- C. Amoeba Dubia
- D. Phyllum Sarcodina

A. Amoeba verrucosa has a definite pellicle (its body surface is wrinkled with a tough pellicle); the Class 11 notes list it among the Amoeba species with a pellicle.

B. Amoeba proteus is a naked amoeba with no pellicle; its shape is not fixed because the pellicle is absent.

ubia has no pellicle.

D. Sarcodina is a phylum, not a species, and its members (including naked amoebae) do not all have a pellicle.

Question 80 Botany & Zoology

Which one is the most threatened area on the earth for (wild life):

- A. Sub-tropical rain forest
- B. Tropical rain forest ✓ **Correct answer**
- C. Antarctica forest
- D. Both A and B

A. Sub-tropical rainforests are threatened, but the tropical rainforest is the most threatened and biodiverse.

B. The tropical rainforest holds the greatest biodiversity and faces the greatest threat from deforestation, making it the most threatened area for wildlife.

C. Antarctica has no forest.

D. The single most threatened area is the tropical rainforest, not both together.

Question 81 Botany & Zoology

Technique of producing a cell line whose members contain identical copies of desired genes is called

- A. Gene therapy
- B. Gene cloning ✓ **Correct answer**
- C. All of the above
- D. None of the above

A. Gene therapy treats disease by inserting genes into a patient; it does not produce a cell line with identical gene copies.

ing produces many identical copies of a desired gene (a clone), i.e. a cell line whose members contain identical copies of the gene.

C. Only gene cloning fits, so "All of the above" is wrong.

D. Option B is correct, so "None of the above" is wrong.

Question 82 Botany & Zoology

Silverfish is included in:

- A. Amphibian
- B. Echinodermata
- C. Arthropods ✓ **Correct answer**
- D. Fishes

A. The silverfish is not an amphibian; it is an insect.

B. The silverfish is not an echinoderm (starfish, sea urchin).

C. The silverfish (Lepisma saccharina) is an insect, and insects belong to the phylum Arthropoda.

D. The silverfish is not a fish; the name refers only to its silvery appearance.

Question 83 Botany & Zoology

In our expiratory air, oxygen content is around:

- A. 4%
- B. 20%
- C. 25%
- D. 16% ✓ **Correct answer**

A. 4% is the carbon dioxide content of exhaled air, not the oxygen content.

B. 20% is about the oxygen content of inhaled (atmospheric) air, not exhaled air.

r contains about 16% oxygen, not 25%.

D. Exhaled air contains about 16% oxygen (and about 4% carbon dioxide).

Question 84 Botany & Zoology

A facultative parasite is:

- A. An obligate saprophyte
- B. Parasitic but can live as saprophyte
- C. Normally a saprophyte
- D. Normally a saprophyte but can live as parasite under favorable conditions ✓ **Correct answer**

A. An obligate saprophyte can live only as a saprophyte; a facultative parasite can also parasitise.

B. This describes a facultative saprophyte (normally parasitic, able to live as a saprophyte), the reverse of a facultative parasite.

C. This is incomplete: a facultative parasite is normally a saprophyte AND can live as a parasite under favourable conditions.

D. This is the definition of a facultative parasite.

Question 85 Botany & Zoology

A cavity formed by the disintegration of protoxylem tracheids in Equisetum stem is called:

- A. Valledupar canal
- B. Cranial canal ✓ **Correct answer**
- C. Central cavity
- D. Air chamber

A. The vallecular canals lie in the cortex of the Equisetum stem, not in the vascular bundle

protoxylem disintegrates.

B. The canal formed by the disintegration of the protoxylem in Equisetum is the carinal canal (printed "Cranial canal"); this is the intended answer.

C. The central cavity (pith cavity) is the large hollow centre of the stem, not the protoxylem canal.

D. The air chambers are the cortical air spaces, not the protoxylem canal.

Note: Note: Option B prints "Cranial canal"; the correct term is "carinal canal" (see Reproduction notes).

Question 86 Botany & Zoology

Which one of the following processes uses a protein to help a substance move across the membrane from high to low concentration of that substance:

- A. Osmosis
- B. Active transport
- C. Simple diffusion
- D. Facilitated diffusion ✓ **Correct answer**

A. Osmosis is the movement of water across a membrane; it does not use a protein carrier for a substance moving down its gradient.

B. Active transport uses a protein but moves a substance against its concentration gradient (low to high), using energy.

C. Simple diffusion moves a substance down its gradient but needs no protein.

D. Facilitated diffusion uses a membrane protein (channel or carrier) to move a substance down its concentration gradient (high to low) without energy.

87 Botany & Zoology

In frog the vein brings blood from the tongue is:

- A. Lingual ✓ **Correct answer**
- B. Cutaneous
- C. Anterior abdominal
- D. Azygos

A. The lingual vein drains blood from the tongue in the frog.

B. The cutaneous vein drains the skin, not the tongue.

C. The anterior abdominal vein drains the ventral body wall, not the tongue.

D. The azygos vein drains the body wall, not the tongue.

Question 88 Botany & Zoology

Spores are liberated from the Sporogonium only by the decay of gametophyte in:

- A. Marchantia
- B. Riccia ✓ **Correct answer**
- C. Funaria
- D. Anthoceros

A. In Marchantia the sporogonium has a seta and dehisces to release spores; it is not liberated only by decay of the gametophyte.

B. In Riccia the sporogonium is embedded in the thallus with no seta or dehiscence mechanism, so the spores are liberated only when the gametophyte decays.

C. In Funaria the capsule opens by the falling of the operculum to release spores.

D. In Anthoceros the capsule splits open to release spores.

89 Botany & Zoology

Extra-chromosomal hereditary determinants are known as:

- A. Plastids
- B. Ribo-somes
- C. Plasmids ✓ **Correct answer**
- D. None of above

A. Plastids (chloroplasts) carry some extra-chromosomal genes, but the general term for extra-chromosomal hereditary determinants is plasmids.

B. Ribosomes are the sites of protein synthesis, not hereditary determinants.

C. Plasmids are extra-chromosomal DNA molecules that carry hereditary determinants (e.g. antibiotic resistance) in bacteria.

D. Option C is correct, so "None of above" is wrong.

Question 90 Botany & Zoology

The ATP is formed in:

- A. Ribosomes
- B. Golgi bodies
- C. Mitochondria ✓ **Correct answer**
- D. None of the above

A. Ribosomes synthesise proteins, not ATP.

B. Golgi bodies modify and package proteins, they do not form ATP.

C. Mitochondria are the site of oxidative phosphorylation, where most of the cell's ATP is formed.

D. Option C is correct, so "None of the above" is wrong.

91 Botany & Zoology

Which of the following algae is responsible for the red tide?

- A. Gonyaulax ✓ **Correct answer**
- B. Polysiphonia nigriscene
- C. Cephaleuros
- D. Fucus furcatus

A. Gonyaulax is a dinoflagellate whose blooms cause red tides.

B. Polysiphonia is a red alga but is not responsible for red tides.

C. Cephaleuros is a parasitic green alga, not a red-tide organism.

D. Fucus is a brown alga (rockweed), not a red-tide organism.

Note: Note: Option B prints "Polysiphonia nigriscene" (Polysiphonia nigrescens).

Question 92 Botany & Zoology

Egg-laying mammals belong to which of the following group:

- A. Placentals
- B. Marsupials
- C. Monotremes ✓ **Correct answer**
- D. Cetacea

A. Placentals give birth to live young, they do not lay eggs.

B. Marsupials give birth to live (underdeveloped) young, they do not lay eggs.

C. Monotremes (platypus, echidna) are the egg-laying mammals.

D. Cetaceans (whales, dolphins) give birth to live young, they do not lay eggs.

93 Botany & Zoology

Flexing or bending of our arm is done by:

- A. Biceps ✓ **Correct answer**
- B. Triceps
- C. Paralysis
- D. Paresis

A. The biceps is the flexor muscle of the forearm; it bends the arm at the elbow.

B. The triceps is the extensor muscle; it straightens the arm.

C. Paralysis is the loss of muscle function, not a muscle.

D. Paresis is partial paralysis, not a muscle.

Question 94 Botany & Zoology

A pyrimidine that is absent in RNA is:

- A. Uracil
- B. Thymine ✓ **Correct answer**
- C. Cytosine
- D. Adenine

A. Uracil is a pyrimidine present in RNA (it replaces thymine).

B. Thymine is a pyrimidine found in DNA, not in RNA.

C. Cytosine is a pyrimidine present in both DNA and RNA.

D. Adenine is a purine, not a pyrimidine, and it is present in RNA.

Question 95 Botany & Zoology

Only one ovule is present in the ovary of _____ family.

npositae ✓ **Correct answer**

- B. Labiatae
- C. Solanaceae
- D. None of the above

A. In Compositae (Asteraceae) the ovary contains a single ovule.

B. In Labiatae (Lamiaceae) the ovary has four ovules.

C. In Solanaceae the ovary has many ovules.

D. Option A is correct, so "None of the above" is wrong.

Question 96 Botany & Zoology

Cortex develops from:

- A. Dermatogens
- B. Periblem ✓ **Correct answer**
- C. Pleurome
- D. None of the above

A. The dermatogen gives rise to the epidermis, not the cortex.

B. The periblem (ground meristem) gives rise to the cortex.

C. The plerome gives rise to the stele (vascular cylinder), not the cortex.

D. Option B is correct, so "None of the above" is wrong.

Question 97 Botany & Zoology

Nourishing tissue surrounding the spore producing tissue in a young sporangium is:

- A. Archesporium
- B. Tapetum ✓ **Correct answer**
- C. Spore mother cells

A. The archesporium is the spore-producing tissue itself, not the tissue nourishing it.

B. The tapetum is the nourishing layer surrounding the sporogenous tissue in a young sporangium.

C. Spore mother cells are the cells that produce spores, not the nourishing tissue.

D. Sporocytes are the spore mother cells, not the nourishing tissue.

Question 98 Botany & Zoology

The phenomenon of 'sulphur shower' is found in:

- A. Mosses
- B. Cyeas
- C. Dryopteris
- D. Pinus ✓ **Correct answer**

A. Mosses do not produce a "sulphur shower" of pollen.

B. Cycas does not produce the "sulphur shower" phenomenon.

C. Dryopteris is a fern; it reproduces by spores, not by a pollen shower.

D. "Sulphur shower" is the cloud of yellow pine pollen shed by Pinus in large quantities.

Note: Note: Option B prints "Cyeas" (Cycas).

Question 99 Botany & Zoology

Leaf gaps and leaf traces are seen in the rhizome of:

- A. Psilotum
- B. Ophioglossum
- C. Pteris ✓ **Correct answer**

A. Psilotum is a primitive vascular plant whose stem has no leaf gaps.

B. Ophioglossum is a eusporangiate fern; the classic textbook example for leaf gaps and leaf traces in the rhizome is Pteris.

C. In Pteris, the rhizome stele shows leaf gaps and leaf traces where the leaf traces depart to the leaves.

D. Marsilea is an aquatic fern; the classic example for leaf gaps and leaf traces is Pteris.

Note: Note: Option D prints "Mars ilea" (Marsilea).

Question 100 Botany & Zoology

In which portion of the cell ribosomes are manufactured:

- A. Golgi apparatus
- B. Lysosomes
- C. Nucleolus ✓ **Correct answer**
- D. Pores

A. The Golgi apparatus modifies and packages proteins; it does not manufacture ribosomes.

B. Lysosomes are digestive organelles; they do not manufacture ribosomes.

C. Ribosomes are manufactured in the nucleolus, where ribosomal RNA is synthesised and assembled with proteins.

D. Nuclear pores transport material; they do not manufacture ribosomes.

Note: Note: The print ends the stem with a stray semicolon ("manufactured ;").

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