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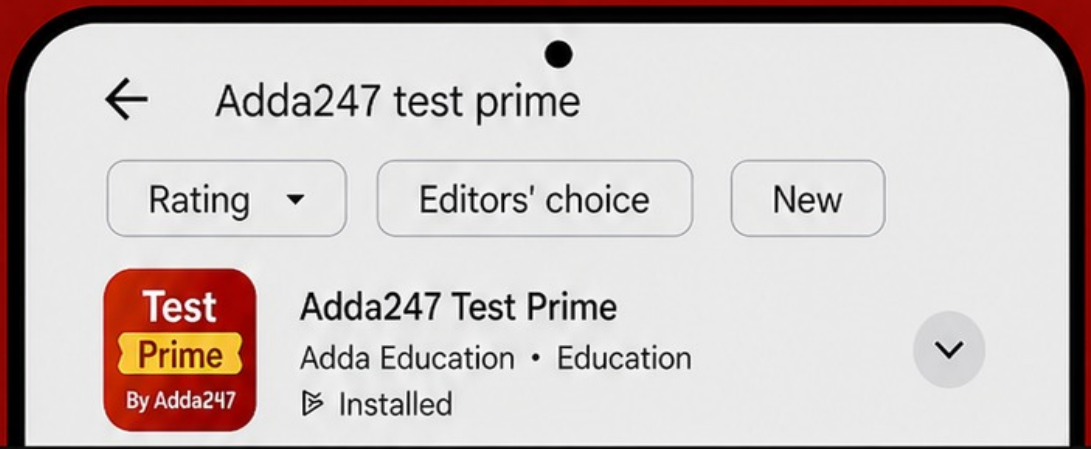

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AIIMS B.Sc Nursing 2025 Question Paper with Solutions

Physics

Q1. The energy density inside a solenoid is $10^5\ \text{J/m}^3$.
Find the value of the magnetic field B in the solenoid.

Explanation:
Energy density in a magnetic field is given by:
$u = \dfrac{B^2}{2\mu_0}$
Substitute $u = 10^5\ \text{J/m}^3$, $\mu_0 = 4\pi \times 10^{-7}$:
$10^5 = \dfrac{B^2}{2 \times 4\pi \times 10^{-7}} \Rightarrow B^2 = 2 \times 4\pi \times 10^{-7} \times 10^5 = 8\pi \times 10^{-2}$
$B = \sqrt{8\pi \times 10^{-2}} \approx 0.5\ \text{T}$

Q2.A charge of $+5\ \mu\text{C}$ and $-5\ \mu\text{C}$ are separated by a distance of $0.2\ \text{m}$, forming an electric dipole.
Given electric field $E = 20\ \text{V/m}$ and angle $\theta = 30^\circ$ between the dipole moment $\vec{P}$ and $\vec{E}$, find the torque acting on the dipole.

Explanation:
Torque on a dipole in an electric field is given by:
$\tau = pE\sin\theta$, where $p = q \cdot d$
$p = 5 \times 10^{-6} \cdot 0.2 = 1 \times 10^{-6}\ \text{Cm}$
$\tau = 1 \times 10^{-6} \cdot 20 \cdot \sin 30^\circ = 1 \times 10^{-6} \cdot 20 \cdot 0.5 = 10^{-5}\ \text{Nm}$

Q3. An R-L-C circuit operates with:
Voltage $V = 220\ \text{V}$, Frequency $f = 50\ \text{Hz}$, Resistance $R = 10\ \Omega$, and Power factor $\cos\phi = 0.5$.
Find the average power consumed.

Explanation:
Average power consumed in an AC circuit is given by:
$P = VI\cos\phi$
Current $I = \dfrac{V}{R} = \dfrac{220}{10} = 22\ \text{A}$
$P = 220 \cdot 22 \cdot 0.5 = 2420\ \text{W}$

Q4.Find the terminal voltage of a cell given:
EMF $E = 10\ \text{V}$, internal resistance $r = 1\ \Omega$, and external resistance $R = 5\ \Omega$.

Explanation:
Terminal voltage is given by:

$V = E - Ir$

Current, $I = \dfrac{E}{R+r} = \dfrac{10}{5+1} = \dfrac{10}{6} = \dfrac{5}{3}$ A

So, $V = 10 - \left(\dfrac{5}{3} \times 1\right) = \dfrac{25}{3} = 8.33$ V

Q5.Find the dimensional formula of mobility.

Explanation:

Mobility μ is defined as: $\mu = \dfrac{v_d}{E}$

Drift velocity v_d has units of $\text{m/s} = [LT^{-1}]$

Electric field E has units of $\text{V/m} = [MLT^{-3}A^{-1}]$

So,

$$\mu = \frac{[LT^{-1}]}{[MLT^{-3}A^{-1}]} = [M^{-1}T^2A]$$

Q6.A thin rod has mass $M = 0.1$ kg and length $L = 0.3$ m.
Find the moment of inertia (M.O.I.) about its center of mass.

Explanation:

Moment of inertia of a thin rod about its center is:

$$I = \frac{1}{12}ML^2 = \frac{1}{12} \cdot 0.1 \cdot (0.3)^2 = \frac{0.1 \cdot 0.09}{12} = \frac{0.009}{12} = 7.5 \times 10^{-4}\ \text{kg} \cdot \text{m}^2$$

Q7. Two polaroids are placed at an angle of 30° to each other. Unpolarized light of intensity $I = 40\ \text{W/m}^2$ passes through the first polaroid.
Find the intensity of light after it passes through the second polaroid.

Explanation:

After the first polaroid, intensity becomes

$$I_1 = \frac{I}{2} = \frac{40}{2} = 20\ \text{W/m}^2$$

After the second polaroid at angle $\theta = 30^\circ$,

$$I_2 = I_1 \cos^2\theta = 20\cos^2 30^\circ = 20\left(\frac{\sqrt{3}}{2}\right)^2 = 20 \cdot \frac{3}{4} = 15\ \text{W/m}^2$$

Q8. The refractive index of a prism material is $n = 1.6$.
Find the ratio of the angle of prism A to the angle of minimum deviation D_m.

Explanation:

At minimum deviation, the relation is:

$$n = \frac{\sin\left(\dfrac{A + D_m}{2}\right)}{\sin\left(\dfrac{A}{2}\right)}$$

Solving this relation directly is complex. For $n = 1.6$, a standard approximation for an equilateral prism gives:

$$\frac{A}{D_m} \approx \frac{3}{4}$$

Q9. Given: Frequency $f = 50\ \text{MHz} = 50 \times 10^6\ \text{Hz}$ and electric field amplitude $E = 5.6\ \text{V/m}$.
Find the magnetic field B of the electromagnetic wave.

Explanation:
In EM waves, $\frac{E}{B} = c \Rightarrow B = \frac{E}{c}$
Where $c = 3 \times 10^8\ \text{m/s}$
So,
$$B = \frac{5.6}{3 \times 10^8} = 1.867 \times 10^{-8}\ \text{T} \approx 1.87 \times 10^{-8}\ \text{T}$$

Q10.

A pipe closed at one end has a length $L = 55, \text{cm}$ and the speed of sound in air is $V = 330, \text{m/s}$.
Find the fundamental frequency of vibration.

Explanation:
In a pipe closed at one end, the fundamental mode corresponds to a quarter wavelength, so $L = \frac{\lambda}{4} \Rightarrow \lambda = 4L = 4 \times 0.55 = 2.2, \text{m}$.
The frequency is $f = \frac{V}{\lambda} = \frac{330}{2.2} = 150, \text{Hz}$.

Q11. Find the radius of the trajectory of a proton moving at $v = 4 \times 10^5, \text{m/s}$ in a magnetic field of $B = 0.01, \text{T}$.

Explanation:
Radius of circular motion is given by $r = \frac{mv}{qB}$.
Given:
$m = 1.67 \times 10^{-27}, \text{kg}$,
$q = 1.6 \times 10^{-19}, \text{C}$,
$v = 4 \times 10^5, \text{m/s}$,
$B = 0.01, \text{T}$.

Then
$r = \frac{1.67 \times 10^{-27} \times 4 \times 10^5}{1.6 \times 10^{-19} \times 0.01} = \frac{6.68 \times 10^{-22}}{1.6 \times 10^{-21}} = 0.4175, \text{m}$.

Q12. The powers of an objective lens and an eye lens are $2, \text{D}$ and $20, \text{D}$ respectively. Find the length of the telescope.

Explanation:
Focal length is given by $f = \frac{1}{P}$.
Objective: $f_o = \frac{1}{2} = 0.5, \text{m}$,
Eye lens: $f_e = \frac{1}{20} = 0.05, \text{m}$.

Total length: $L = f_o + f_e = 0.5 + 0.05 = 0.55, \text{m}$.

Q13.Two bodies of mass $1, \text{kg}$ and $4, \text{kg}$ are connected with a spring of spring constant $K = 5, \text{N/m}$.
Find the time period of oscillation.

Explanation:
Reduced mass: $\mu = \frac{m_1 m_2}{m_1 + m_2} = \frac{1 \times 4}{1+4} = \frac{4}{5} = 0.8, \text{kg}.$
Time period: $T = 2\pi\sqrt{\frac{\mu}{K}} = 2\pi\sqrt{\frac{0.8}{5}} = 2\pi\sqrt{0.16} = 2\pi \times 0.4 \approx 2.51, \text{s}.$

Q14.

The mutual inductance between two coils is $M = 2, \text{H}$.
The current changes from 0 to $10, \text{A}$ in $0.5, \text{s}$.
Find the induced EMF.

Explanation:
$\varepsilon = M \cdot \frac{dI}{dt} = 2 \cdot \frac{10-0}{0.5} = 2 \cdot 20 = 40, \text{V}.$

Q15.

In a Young's Double Slit Experiment (YDSE):
Slit separation $d = 2, \text{mm}$, screen distance $D = 1.6, \text{m}$, and light wavelength $\lambda = 500, \text{nm}$.
Find the fringe width.

Explanation:
Fringe width is given by $\beta = \frac{\lambda D}{d}$.

Convert units: $\lambda = 500 \times 10^{-9}, \text{m}$, $d = 2 \times 10^{-3}, \text{m}$.

So $\beta = \frac{500 \times 10^{-9} \times 1.6}{2 \times 10^{-3}} = \frac{800 \times 10^{-9}}{2 \times 10^{-3}} = 0.0004, \text{m} = 0.4, \text{mm}.$

Q16.Mutual Inductance between 2 coils is 2H, current changes from 0 to 10A in 0.5 sec. Find EMF?

Explanation:

Given:
Mutual inductance (M) = 2 H
Change in current (ΔI) = 10 A
Time (Δt) = 0.5 s

EMF = M × (ΔI / Δt) = 2 × (10 / 0.5) = **40 V**

Q 17. Find the minimum wavelength of the Paschen series is 820 nm.

Explanation:

Minimum wavelength occurs when electron transitions from n = ∞ to n = 3.

Using formula:
λ = 9 / R ≈ 9 / (1.097 × 10⁷) ≈ **820 nm**

Q 18. What is the molar specific heat of an ideal monoatomic gas at constant pressure?

Explanation:

$C_p = (5/2) \times R =$ **20.8 J/mol·K**

Q 19. If magnetic susceptibility is 2499, then find magnetic permeability.

Explanation:

Given:
Magnetic susceptibility (χ_m) = 2499
$\mu = \mu_0 (1 + \chi_m)$
$\mu = 4\pi \times 10^{-7} \times (1 + 2499) =$ **3.14×10^{-3} H/m**

Q 20. Velocity of the fourth orbit of hydrogen atom?

Explanation: **$v_n = 2.18 \times 10^6 / n$**
$v_4 = 2.18 \times 10^6 / 4 = 5.45 \times 10^5$ m/s

Q 21. A wire of length 5 m, current 5 A flowing in +X axis. Find B at a distance 30 cm on Y-axis.

Explanation: Given:
Current I = 5 A
Distance r = 0.3 m

$B = (\mu_0 I) / (2\pi r)$
$B = (4\pi \times 10^{-7} \times 5) / (2\pi \times 0.3) =$ **6.67×10^{-6} T**

Q 22.A focal length of objective lens is 50 mm, focal length of eye lens is 5 cm and length of tube is 15 cm (d_o = 25 mm), then find magnification of microscope.

Explanation:

Given:
Objective focal length = 5 cm
Eye piece focal length = 5 cm
Tube length = 15 cm
Least distance of distinct vision (do) = 25 cm

Magnification = $(L / f_o) \times (d_o / f_e) = (15 / 5) \times (25 / 5) =$ **15**

Q 23. Three capacitors connected in series with voltage . Find potential difference at ?

Explanation:

Three Capacitors Connected in Series – Find Potential Difference

Concept:
In a series combination of capacitors:

- **The charge (Q) on each capacitor is the same.**
- **Voltage divides inversely proportional to capacitance.**

Formula:

- **Total voltage: V=V1+V2+V3V = V1 + V2 + V3V=V1+V2+V3**
- **Vi=Q/CiV_i = Q / C_iVi=Q/Ci**
- **So,** $V_i \propto \frac{1}{C_i}$

Q 24. A step-down transformer connected to 220 V A.C., having a turns ratio of 20:1. Find the current in the secondary coil if it is connected to a 25 Ω resistor.

Explanation:

Primary voltage = 220 V
Turns ratio = 20:1
Secondary voltage = 220 / 20 = 11 V
Resistor = 25 ohms

Current = V / R = 11 / 25 = **0.44 A**

Q 25. Find value of magnetic field in a solenoid of energy density J/m³.

Explanation:

Energy density (u) = $B^2 / (2\mu_0)$
So, $B = \sqrt{(2\mu_0 \times u)}$
To solve, numerical value of energy density is needed.
More data needed.

Q 26. Find acceleration: u = 5 m/s, a = constant, time = 4 sec, distance = 60 m.

Explanation:

Initial velocity (u) = 5 m/s
Time = 4 s
Distance = 60 m

Using: $s = ut + (1/2)\, a\, t^2$
$60 = 5\times4 + 0.5\times a\times16 \rightarrow 60 = 20 + 8a \rightarrow a = (60 - 20) / 8 =$ **5 m/s²**

Q 27. R-L-C circuit having R = 10 Ohm, power factor = 0.5. Find average power when V = 220V, f = 50 Hz.

Explanation:

Given:
R = 10 ohm
V = 220 V
Power factor = 0.5

Power = $(V^2 / R) \times$ power factor = $(220^2 / 10) \times 0.5 =$ **2420 W**

Q 28. Two polaroids at angle 30°, unpolarised light passes through one with I = 40 W/m². Find the intensity after it passes through another.

Explanation:

Unpolarised light intensity = 40 W/m²
After first polaroid: I = 20 W/m²
Second polaroid at 30°: I = 20 × cos²(30°) = 20 × (3/4) = 15 W/m²

Q 29. Two blocks 3 kg and 1 kg placed on a horizontal surface. Force = 5 N on left side. Find the force between the two bodies.

Explanation:

Masses: m1 = 3 kg, m2 = 1 kg
Total force = 5 N
Acceleration = F / (m1 + m2) = 5 / 4 = 1.25 m/s²
Force on 1 kg block = m × a = 1 × 1.25 = 1.25 N

Q 30. Two wires having currents 5 A and 2 A, placed at a distance of 0.2 m. Find force per unit length.

Explanation:

Currents: I1 = 5 A, I2 = 2 A
Distance = 0.2 m

$F/L = (\mu_0 I1 I2) / (2\pi d)$
$= (4\pi \times 10^{-7} \times 5 \times 2) / (2\pi \times 0.2) =$ **1×10^{-5} N/m**

Chemistry

Question 1:
What will be the oxidation number of elements in O_3, P_4, and S_8?

(A) –1, 0, +1
(B) 1, +1, –2
(C) 0, 0, 0
(D) –2, 1, 0

Answer: The correct answer is option (C), 0, 0, 0.
Explanation: In their elemental forms (O_3, P_4, and S_8), oxygen, phosphorus, and sulfur each

have an oxidation number of zero because they are not combined with any other element.

Question 2:
Which of the following is true for an adiabatic process?

(1) $\Delta H = 0$
(2) $\Delta W = 0$
(3) $\Delta Q = 0$
(4) $\Delta V = 0$

Answer: The correct answer is option (3), $\Delta Q = 0$.
Explanation: In an adiabatic process, there is no heat exchange with the surroundings, so the heat change (ΔQ) is zero.

Question 3:
What products are obtained from the hydrolysis of lactose?

(a) lactose + Glucose
(b) Glucose + Glucose
(c) Glucose + Fructose
(d) Glucose + Galactose

Answer: The correct answer is option (d), Glucose + Galactose.
Explanation: Lactose is a disaccharide composed of glucose and galactose, which are the products formed on hydrolysis.

Question 4:
What is the electronic configuration of palladium?

A) $[Kr]\ 5s^2\ 4d^8$
B) $[Kr]\ 5s^1\ 4d^9$
C) $[Kr]\ 4d^{10}$
D) $[Kr]\ 5s^2\ 4d^{10}$

Answer: The correct answer is option (C), $[Kr]\ 4d^{10}$.
Explanation: Palladium has an unusual electronic configuration due to the stability of a fully filled d-subshell. It completely fills the 4d orbital and leaves the 5s orbital empty.

Question 5:
If a 200 ml aqueous solution of 10 g NaOH is prepared, then find the molarity of the resulting solution.

(a) 1.25 M
(b) 1.5 M
(c) 1.66 M
(d) 12.5 M

Answer: The correct answer is option (a), 1.25 M.

Explanation:

The molar mass of NaOH is 40 g/mol

Given mass = 10g, the number of moles is

$\text{moles} = \frac{10}{40} = 0.25 \text{ mol.}$

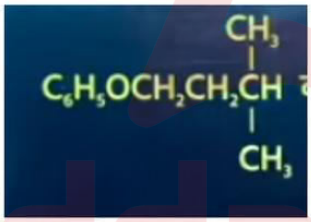
For a solution volume of 0.2 L, the molarity M is

$M = \frac{0.25}{0.2} = 1.25 \text{ M.}$

Question 6:
Atomic radii and ionic radii of the lanthanoid series increase from La to Lu due to?
(1) Lanthanoid contraction
(2) Actenoid contraction
(3) Intermolecular bonding
(4) None

Answer: The correct answer is option (1), Lanthanoid contraction.
Explanation: As we move across the lanthanide series, poor shielding by 4f electrons leads to increased nuclear attraction, causing the radii to decrease which is a phenomenon called lanthanoid contraction.

Question 7:

What is the IUPAC name of 

Answer: The correct answer is Isopropoxybenzene.
Explanation: The compound consists of a benzene ring bonded to an isopropoxy group (–$OCH(CH_3)_2$), making the IUPAC name isopropoxybenzene.

Question 8:
Which of the following compounds does not give the Friedel-Crafts reaction?
(A) Benzene
(B) Chlorobenzene
(C) Benzoic acid
(D) Phenol

Answer: The correct answer is option (C), Benzoic acid.
Explanation: Benzoic acid is electron-withdrawing and deactivates the benzene ring, preventing it from undergoing Friedel-Crafts reactions.

Question 9:
The number of unpaired electrons in the paramagnetic complex ion $[FeF_6]^{3-}$ is?
(1) 2
(2) 3

(3) 5
(4) 4

Answer: The correct answer is option (3), 5.
Explanation: Fe^{3+} has 5 unpaired electrons in 3d orbitals, and F^- , being a weak field ligand, does not cause pairing, so all 5 electrons remain unpaired.

Question 10:

Which of the following is not a nucleophile?

(A) BF_3

(B) NH_3

(C) $C_2H_5O^-$

(D) All of these

Answer: The correct answer is option (A) BF_3

Explanation: BF_3 is an electron-deficient species and acts as an electrophile, not a nucleophile. NH_3 and $C_2H_5O^-$ have lone pairs and readily donate electrons, so they are nucleophiles.

Question 11:
Which of the following statements is/are correct?

I. Atomic radius increases as we go from left to right in a period.
II. Atomic size increases as we go down a group.

1. Both I and II
2. Neither I nor II
3. Only II
4. Only I

Answer: The correct answer is option (3) Only II

Explanation: Atomic radius decreases from left to right across a period because the increasing positive charge of the nucleus pulls electrons closer. However, atomic size increases down a group as new electron shells are added, making atoms larger. Thus, only statement II is correct.

Question 12:
Write the highest oxidation state of Cr and Mn.

1. +2, +3

2. +6, +7

3. +4, -4

4. +3, -5

Answer: The correct answer is option (2) +6, +7

Explanation:
The highest oxidation state of chromium (Cr) is +6, commonly seen in compounds like CrO_3 and chromates. The highest oxidation state of manganese (Mn) is +7, found in permanganates (MnO_4^-). Other options do not represent the maximum oxidation states of these elements.

Question 13:
By which bond are amino acids joined together?

1. Dipole-Dipole

2. Ionic

3. Hydrogen

4. Amide

Answer: The correct answer is option (4), Amide

Explanation:
Amino acids are joined together by amide bonds, also called peptide bonds, formed between the amino group of one amino acid and the carboxyl group of another. This bond links amino acids to form proteins.

Question 14:
Match the following:

Column I	**Column II**
(i) Homohaptic	A) $EDTA^{4-}$
(ii) Heterohaptic	B) $[Fe(CNH_3)_6]^{3+}$
(iii) Polydentate	C) $[Re(H_2O)_2(NH_3)_2]$
(iv) Bidentate	D) $C_2O_4^{2-}$

Answer:
(i) Homohaptic — D) $C_2O_4^{2-}$
(ii) Heterohaptic — B) $[Fe(CNH_3)_6]^{3+}$
(iii) Polydentate — A) $EDTA^{4-}$
(iv) Bidentate — C) $[Re(H_2O)_2(NH_3)_2]$

Explanation:

- **Homohaptic** ligands coordinate through atoms of the same kind
- **Heterohaptic** ligands can coordinate through different atoms
- **Polydentate** ligands (e.g., EDTA) bind through multiple sites.

- **Bidentate** ligands bind through two donor atoms and contain ligands with two bonding sites.

Question 15:
Match the following:

Column I	**Column II**
(a) Vitamin E	(i) Night blindness
(b) Vitamin C	(ii) Beri-Beri
(c) Vitamin A	(iii) Muscular weakness
(d) Vitamin B1	(iv) Scurvy

Answer:
(a) Vitamin E — (iii) Muscular weakness
(b) Vitamin C — (iv) Scurvy
(c) Vitamin A — (i) Night blindness
(d) Vitamin B1 — (ii) Beri-Beri

Explanation:

- Vitamin E deficiency causes muscular weakness and neurological problems.
- Vitamin C deficiency leads to scurvy, characterised by bleeding gums and weakness.
- Vitamin A deficiency causes night blindness.

- Vitamin B1 (thiamine) deficiency causes beri-beri, affecting the cardiovascular and nervous systems.

Question 16. The decreasing order of C–X bond length in $CH_3–X$ is:

A) $CH_3I > CH_3Br > CH_3Cl > CH_3F$

B) $CH_3F > CH_3Cl > CH_3Br > CH_3I$

C) $CH_3F > CH_3Cl > CH_3I > CH_3Br$

D) $CH_3I > CH_3Cl > CH_3F > CH_3Br$

Answer: (A) $CH_3I > CH_3Br > CH_3Cl > CH_3F$

Explanation:

Bond length increases as the halogen atom size increases. Iodine is the largest, so CH_3I has the longest bond, followed by Br, Cl, and F (smallest). Thus, $CH_3I > CH_3Br > CH_3Cl > CH_3F$.

Question 17. Zirconium is a transition element. But Zinc is not because:

A) Both Zr^{4+} and Zn^{2+} ions are colourless and form white compounds

B) In case of Sc, 3d orbitals are partially filled but in Zn these are filled

C) Last electron is assumed to be added to 4s level in case of Zn

D) Both Zr and Zn do not exhibit variable oxidation states

Answer: (B) In case of Sc, 3d orbitals are partially filled but in Zn these are filled

Explanation:

Transition elements have partially filled d-orbitals. Zinc's 3d orbital is completely filled ($3d^{10}$) in both atom and Zn^{2+} ion, so it does not show typical transition properties, unlike zirconium.

Question18. For the reaction $N_2 + O_2 \rightarrow 2NO$, if initial concentrations are 0.5 M N_2 and 0.7 M O_2, what is the concentration of NO formed at equilibrium if 0.4 M N_2 is left?

A) 0.58 M

B) 0.48 M

C) 1.15 M

D) 2.014 M

Answer: (B) 0.48 M

Explanation:

N_2 consumed = 0.5 – 0.4 = 0.1 M. For every 1 mole N_2, 2 moles NO are formed, so NO formed = 0.2 M. But if the answer is 0.48 M, it may be based on total NO formed from both

N_2 and O_2.

Question 19. The symbol for an atom containing 20 protons, 22 neutrons, and 20 electrons is:

A) Mg^{42}

B) Se^{42}

C) Ca^{42}

D) K^{42}

Answer: (C) Ca^{42}

Explanation:

Atomic number (protons) = 20, which is Ca (calcium). Mass number = 20 + 22 = 42. Thus, the symbol is Ca^{42}.

Question 20. Which is the strongest electrolyte in the following?

A) HF

B) NH_3

C) $CaCl_2$

D) AgCl

Answer: (C) $CaCl_2$

Explanation:

$CaCl_2$ is a strong electrolyte because it completely dissociates into ions in water, unlike HF (weak acid), NH_3 (weak base), and AgCl (sparingly soluble).

Question 21. The catalytic activity of transition elements is related to their:

A) Variable oxidation states

B) Surface area

C) Complex formation ability

D) Magnetic moment

Answer: (A) Variable oxidation states

Explanation:

Transition elements can change oxidation states easily, which allows them to act as catalysts by providing alternate reaction pathways with lower activation energy.

Question 22. The wrong pair among the following catalysts and their respective processes is:

A) $[RhCl(PPh_3)_2]$: Hydrogenation

B) $TiCl_4 + Al(C_2H_5)_3$: Polymerisation

C) V_2O_3: Haber Bosch process

D) Nickel: Hydrogenation

Answer: (C) V_2O_3: Haber Bosch process

Explanation:

V_2O_3 is not used in the Haber Bosch process; iron is the correct catalyst. Thus, option C is incorrect.

Question 23. Which of the following has only C1–C4 glycosidic linkages?

A) Cellulose

B) Starch

C) Glycogen

D) Maltose

Answer: (A) Cellulose

Explanation:

Cellulose contains only β(1→4) glycosidic linkages, unlike starch and glycogen, which have both 1→4 and 1→6 linkages.

Question 24. Which of the following is a non-reducing sugar?

A) Glucose

B) Fructose

C) Cellulose

D) Maltose

Answer: (C) Cellulose

Explanation:

Cellulose is a non-reducing sugar as it does not have a free anomeric carbon capable of reducing other substances. Glucose, fructose, and maltose are reducing sugars.

Question 25. Which solution is isotonic with human blood?

A) 0.9% NaCl

B) 0.45% NaCl

C) 1.8% NaCl

D) 5% NaCl

Answer: (A) 0.9% NaCl

Explanation:

A 0.9% NaCl solution is isotonic with human blood, meaning it has the same osmotic pressure and does not cause cells to shrink or swell.

Question 26. Which of the following is not a colligative property?

A) Osmotic pressure

B) Ionisation energy

C) Elevation of boiling point

D) Depression of freezing point

Answer: (B) Ionization energy

Explanation:

Ionization energy is an atomic property, not a colligative property. Colligative properties depend on the number of particles in solution, not their nature.

Question 27. Which of the following is not a carbohydrate?

A) Glucose

B) Fructose

C) Urea

D) Maltose

Answer: (C) Urea

Explanation:

Urea is not a carbohydrate; it is an organic compound containing nitrogen. The others are carbohydrates (sugars).

Question 28. Which of the following is a monosaccharide?

A) Glucose

B) Sucrose

C) Maltose

D) Lactose

Answer: (A) Glucose

Explanation:

Glucose is a monosaccharide (simple sugar), while sucrose, maltose, and lactose are disaccharides.

Question 29. Which of the following is not a property of transition elements?

A) Variable oxidation states

B) Formation of coloured ions

C) High ionisation energy

D) Formation of complex compounds

Answer: (C) High ionisation energy

Explanation:

Transition elements typically have lower ionisation energies compared to main group elements. The other properties are characteristic of transition elements.

30. Which statement is logical according to Werner's theory?

A) Primary valency can be ionised

B) Secondary valency can be ionised

C) Primary and secondary valency do not ionise

D) Only primary valency does not ionise

Answer: (A) Primary valency can be ionised

Explanation:

Werner's theory states that primary valency (ionic) can be ionised, while secondary valency (coordination) cannot. Thus, option A is correct.

Biology

1. Which gas was absent in Miller's experiment?

(A) O_2

(B) H_2

(C) NH_3

(D) CH_4

Correct Answer: (A) O_2

Explanation:
In the Miller-Urey experiment, the gases used were methane (CH_4), ammonia (NH_3), hydrogen (H_2), and water vapour (H_2O). Oxygen O_2 was deliberately excluded because it is highly reactive and would have oxidised the organic molecules, preventing their formation. Early Earth's atmosphere was believed to be reducing, not oxidising, which supports the absence of oxygen.

Hence, the correct answer is option A) O_2

2. Which of the following is an autoimmune disease?

(1) Alzheimer's disease

(2) Cystic fibrosis

(3) Sickle cell anaemia

(4) Rheumatoid arthritis

Correct Answer: (4) **Rheumatoid arthritis**

Explanation:
Rheumatoid arthritis is an **autoimmune disease** in which the immune system mistakenly attacks the body's own joints, resulting in inflammation, pain, and tissue damage. The other options are not autoimmune in nature:

- **Alzheimer's disease** is a neurodegenerative disorder.
- **Cystic fibrosis** is a genetic disorder affecting the lungs and digestive system.
- **Sickle cell anemia** is a hereditary blood disorder caused by abnormal hemoglobin.

Hence, the correct answer is option 4) Rheumatoid arthritis

3. The first antibiotic was obtained from which of the following?

(a) Fungus

(b) Bacteria

(c) Virus

(d) Protozoa

Correct Answer: (a) **Fungus**

Explanation:
The first antibiotic, **Penicillin**, was discovered by **Alexander Fleming** in 1928. It was obtained from a fungus called *Penicillium notatum*. Penicillin marked the beginning of the

antibiotic era and is used to treat bacterial infections. Other organisms, such as bacteria, can also produce antibiotics, but the **first** one was discovered in a **fungus**.

Hence, the correct answer is option a) Fungus

4. Which hormone is secreted by the ovary?

(a) HPL (Human Placental Lactogen)

(b) Relaxim

(c) Testosterone

(d) Oxytocin

Correct Answer: (b) Relaxin

Explanation:

Relaxin is a hormone secreted by the ovary, especially during pregnancy. It helps in relaxing the ligaments in the pelvis and softening and widening the cervix in preparation for childbirth.

- HPL is secreted by the placenta.

- Testosterone is mainly secreted by the testes (although a small amount is produced in the ovaries).

- Thyroxine is secreted by the thyroid gland.

Hence, the correct answer is option b) Relaxin

5. CO_2 Acceptor in C_4 Plants is:

(a) PGA (Phosphoglyceric acid)

(b) RuBP (Ribulose bisphosphate)

(c) PEP (Phosphoenolpyruvate)

(d) PGAL (Phosphoglyceraldehyde)

Correct Answer: (c) **PEP (Phosphoenolpyruvate)**

Explanation:
In **C_4 plants**, the primary acceptor of CO_2 is **PEP (Phosphoenolpyruvate)**. The enzyme **PEP carboxylase** helps fix CO_2 to form **oxaloacetate** in the mesophyll cells. This adaptation allows C_4 plants to efficiently carry out photosynthesis even under conditions of high temperature and low CO_2.

- **RuBP** is the CO_2 acceptor in **C_3 plants**.
- **PGA** and **PGAL** are intermediate products of the Calvin cycle, not initial CO_2 acceptors.

Hence, the correct answer is option c) PEP (Phosphoenolpyruvate)

6. First Product of C_4 Cycle is:

(a) OAA (Oxaloacetic acid)

(b) PGA (Phosphoglyceric acid)

(c) PEP (Phosphoenolpyruvate)

(d) RuBP (Ribulose bisphosphate)

Correct Answer: (a) OAA (Oxaloacetic acid)

Explanation:

In the C_4 cycle (Hatch and Slack pathway), carbon dioxide is first fixed in the mesophyll cells by the enzyme PEP carboxylase. This enzyme combines CO_2 with PEP (Phosphoenolpyruvate) to form oxaloacetic acid (OAA), which is the first stable product.

- OAA is the first stable product of the C_4 pathway.
- PGA is the first stable product of C_3 plants.
- PEP is the CO_2 acceptor, not the product.
- RuBP functions in the Calvin cycle (C_3 pathway), not the C_4 cycle.

Hence, the correct answer is option a) OAA (Oxaloacetic acid)

7. Which ion is known to suppress sperm motility?

A) Copper
B) Magnesium
C) Mercury
D) Calcium

Correct Answer: A) Copper

Explanation:

Copper ions are known to have a spermicidal effect. They suppress sperm motility and viability, which is why copper is used in intrauterine devices (IUDs) for contraception. The copper ions released create a toxic environment for sperm, preventing them from reaching and fertilizing the egg.

Hence, the correct answer is option A) Copper

- **Magnesium** and **Calcium** are essential ions for normal sperm function and motility.
- **Mercury** is toxic but does not specifically act to suppress motility like copper does

8. Antagonist of Gibberellin Hormone is:

A) Auxin
B) Cytokinin

C) Abscisic Acid (ABA)
D) Ethylene

Correct Answer: C) Abscisic Acid (ABA)

Explanation:

Abscisic Acid (ABA) acts as an antagonist to gibberellins. While gibberellins promote growth processes such as seed germination, stem elongation, and flowering, ABA generally inhibits these processes. ABA promotes seed dormancy and helps plants respond to stress conditions like drought, acting as a growth inhibitor, opposing gibberellin effects.

- **Auxin** and **Cytokinin** are growth-promoting hormones but do not directly antagonise gibberellins.
- **Ethylene** regulates fruit ripening and senescence but is not a direct antagonist of gibberellins.

Hence, the correct answer is option C) Abscisic Acid (ABA)

9. Protonema is a characteristic of:

A) Ulothrix
B) Polytrichum
C) Polysiphonia
D) Marchantia

Correct Answer: B) Polytrichum

Explanation:

Protonema is the thread-like, filamentous juvenile stage in the life cycle of mosses, which includes **Polytrichum**. It develops from the spore and eventually gives rise to the leafy gametophyte.

- **Ulothrix** is a green alga and does not form protonema.
- **Polysiphonia** is a red alga with a different life cycle structure.
- **Marchantia** is a liverwort that has a thalloid gametophyte and does not produce protonema.

Hence, the correct answer is option B) Polytrichum

10. What family does the housefly belong to?

A) Insecta
B) Muscidae
C) Diptera
D) Formicidae

Correct Answer: B) Muscidae

Explanation:

The housefly (*Musca domestica*) belongs to the family **Muscidae**, which is a family within the order **Diptera** (true flies).

- **Insecta** is a class, not a family.
- **Diptera** is the order that includes all flies.
- **Formicidae** is the family of ants, not flies.

Hence, the correct answer is option B) Muscidae

11. Free RNA without a protein coat is:

A) Viroid
B) Lichen
C) Prion
D) Virus

Correct Answer: A) Viroid

Explanation:

Viroids are infectious agents composed solely of a short strand of circular RNA without any protein coat (capsid). They primarily infect plants and cause various diseases.

- **Lichen** is a symbiotic association of fungi and algae, not related to free RNA.
- **Prions** are infectious proteins without nucleic acids.
- **Viruses** contain nucleic acid (DNA or RNA) enclosed within a protein coat.

Hence, the correct answer is option A) Viroid

12. Sex Determination in Humans:

A) XY
B) X0
C) ZW
D) Haplodiploid

Correct Answer: A) XY

Explanation:

Humans use the **XY** sex determination system, where males have XY chromosomes and females have XX chromosomes. The presence of the Y chromosome, specifically the SRY gene on it, determines maleness.

- **X0** system is found in some insects like grasshoppers, where males have one X chromosome and females have two.
- **ZW** system is found in birds and some reptiles, where females are ZW and males are ZZ.
- **Haplodiploid** system occurs in bees and ants, where males develop from unfertilized eggs (haploid) and females from fertilized eggs (diploid).

13. Which is NOT part of the stomatal apparatus?

A) Guard cells
B) Subsidiary cells
C) Stomatal pore
D) Cuticle cells

Correct Answer: D)Cuticle cells

Explanation:

The stomatal apparatus consists of **guard cells**, **subsidiary cells**, and the **stomatal pore** — all involved in regulating gas exchange and transpiration in plants.

- **Palisade cells** are part of the leaf mesophyll involved in photosynthesis, not part of the stomatal apparatus.
- **Cuticle cells** refer to the waxy protective layer on the leaf surface and are also not part of the stomatal apparatus.

14. Which of the following statements about binomial nomenclature is incorrect?

A) The genus name is written with a capital first letter.
B) The species epithet is written in small letters.
C) Both words are separately underlined when handwritten.
D) When typed, both names are italicised.

Correct Answer: C) Both words are separately underlined when handwritten.

Explanation:

In binomial nomenclature:

- The **genus name** always starts with a capital letter.
- The **species epithet** is written in lowercase letters.
- When handwritten, the **entire scientific name** (genus + species) should be underlined together as one unit, **not separately**.
- When typed, both names are italicised.

15. Which of the following statements about *Drosophila melanogaster* (fruit fly) is incorrect in the context of its use in genetic experiments?

A) It has a short (~2-week) life cycle
B) Grows in complex rare medium
C) Shows clear sex differentiation
D) A single mating produces a large population

Correct Answer: B) Grows in complex rare medium

Explanation:

Drosophila melanogaster is widely used in genetic studies because:

- It has a short life cycle (~10-14 days), allowing quick generations.
- It grows easily on simple, inexpensive media such as mashed fruit or cornmeal agar, **not requiring complex or rare media**.
- It shows clear sex differentiation, making genetic studies involving sex-linked traits straightforward.
- A single mating can produce a large number of offspring, enabling large-scale genetic analysis.

16. Alternate phyllotaxy is found in which of the following plants?

A) Calotropis
B) Guava
C) Alstonia
D) China Rose

Correct Answer: B) Guava

Explanation:

Phyllotaxy refers to the arrangement of leaves on a stem.

- **Alternate phyllotaxy** means one leaf per node, arranged alternately along the stem.
- **Guava** shows alternate leaf arrangement.
- Calotropis and China Rose exhibit opposite phyllotaxy (two leaves per node).
- Alstonia exhibits whorled phyllotaxy (three or more leaves per node).

17. Absent in female frogs are —

A) Trunk
B) Copulatory pad
C) Webbed feet
D) Tympanic

Correct Answer: B) Copulatory pad

Explanation:

- The **copulatory pad** is a thickened, roughened area on the forelimbs of **male frogs** used during amplexus (mating grasp).
- Female frogs **do not have** copulatory pads.
- Trunk, webbed feet, and tympanic membranes (eardrums) are present in both male and female frogs.

Hence, the correct answer is option B) Copulatory pad

18. Write the statement that is NOT true about Kingdom Monera:

a) All bacteria are heterotrophs
b) Cyanobacteria are photosynthetic
c) Anabaena is photosynthetic
d) Methanogen is living in a harsh/extreme habitat

Correct Answer: a) All bacteria are heterotrophs

Explanation:

- Not all bacteria are heterotrophs; some bacteria, like **cyanobacteria (blue-green algae)**, are **photosynthetic autotrophs**.
- **Cyanobacteria** and **Anabaena** (a genus of cyanobacteria) perform photosynthesis.
- **Methanogens** are archaebacteria living in extreme environments such as anaerobic, marshy, or high-temperature habitats, producing methane gas.
- Therefore, the incorrect statement is that all bacteria are heterotrophs.

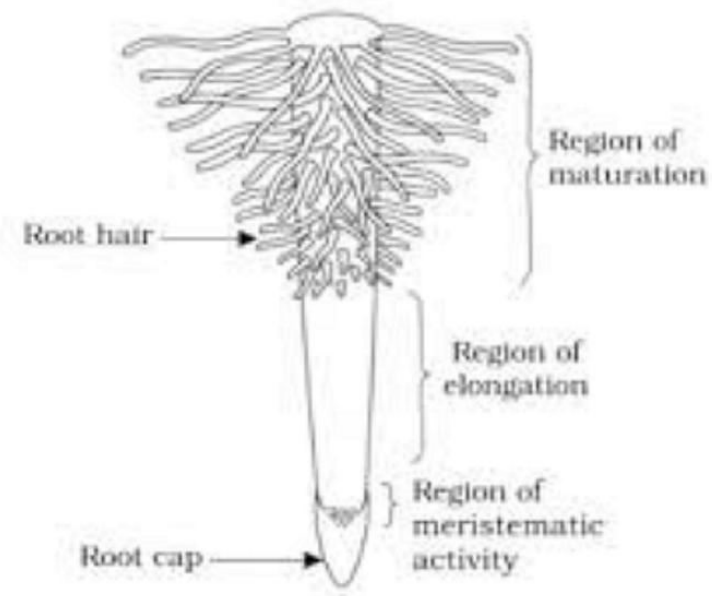
Hence, the correct answer is option a) All bacteria are heterotrophs

19. Find Out The Missing Name-

A. Region of maturation

B. Region of elongation

C. Region of meristematic activity



The regions of the root-tip

The answer is - Root cap

20. Which of the following statements about pollen grains is incorrect?

A) Vegetative cell is bigger and the Generative Cell is smaller
B) The outer layer of pollen grain, called exine, is made up of sporopollenin
C) Pollen grains lose their viability immediately after being released from the anther.
D) Pollen grains are produced in the ovule of a flower.

Correct Answer: D) Pollen grains are produced in the ovule of a flower.

Explanation:
Pollen grains are **produced in the anther**, which is the part of the stamen (male reproductive organ of a flower), **not in the ovule**. Ovules are part of the ovary and give rise to the female gametophyte (embryo sac).

- Statement A is correct: The vegetative (tube) cell is indeed larger and contains the smaller generative cell.
- Statement B is correct: The exine is composed of sporopollenin, one of the most resistant organic materials.
- Statement C is correct in some species, though pollen viability can vary from a few minutes to several months depending on the plant.

21. Which type of DNA is primarily used in DNA fingerprinting?

A) Coding DNA
B) Mitochondrial DNA

C) Satellite DNA / non-coding repeated DNA
D) Ribosomal DNA

Correct Answer: C) Satellite DNA / non-coding repeated DNA

Explanation:
DNA fingerprinting primarily uses **satellite DNA**, which is a type of **non-coding repetitive DNA**. These sequences are highly variable among individuals, making them ideal for identifying genetic differences. The variability in the **number of tandem repeats** (e.g., VNTRs – Variable Number Tandem Repeats) forms the basis of DNA fingerprinting.

- **Coding DNA** is relatively conserved and not useful for differentiation.
- **Mitochondrial DNA** can be used in maternal lineage studies but is not the primary source for DNA fingerprinting.
- **Ribosomal DNA** is also conserved and not sufficiently variable for fingerprinting.

22. What is the function of the Tapetum?

a) Provide protection
b) Produce pollen grains
c) Provide nourishment to the developing pollen grains
d) Store and protect pollen grains

Correct Answer: c) Provide nourishment to the developing pollen grains

Explanation:
The **tapetum** is the innermost layer of the anther wall and plays a crucial role in the development of pollen grains. It is **nutritive in function**, supplying enzymes, proteins, and other materials required for the proper development and maturation of microspores (pollen grains).

- Option **a** is incorrect: Protection is primarily the role of outer anther layers.
- Option **B** is incorrect: Pollen grains are formed from microspore mother cells, not by the tapetum.
- Option **d** is incorrect: Tapetum does not store or protect pollen grains; it nourishes them during development.

23. Which of the following fish has four pairs of gills covered by an operculum?

A) Petromyzon
B) Pristis
C) Trygon
D) Labeo (Rohu)
(E) Catla
(F) Clarias (Magur)

Correct Answer: D) Labeo (Rohu), E) Catla, F) Clarias (Magur)

Explanation:
Fishes that belong to the class **Osteichthyes (bony fishes)**, such as **Labeo (Rohu)**, **Catla**, and **Clarias (Magur)**, have **four pairs of gills** that are **covered by a bony flap called the operculum**.

Let's review each option:

- **Petromyzon** (a jawless fish or cyclostome) has **seven pairs of gill slits** without opercula.
- **Pristis** (a cartilaginous fish, related to sharks and rays) has **5 pairs of gill slits** and **no operculum**.
- **Trygon** (stingray, also a cartilaginous fish) has **5 pairs of gill slits** and **no operculum**.
- **Labeo (Rohu)**, **Catla**, and **Clarias (Magur)** are **bony fishes**, each with **four pairs of gills covered by an operculum**.

24. Which of the following statements is true regarding open vascular bundle?

A) They are present in dicot stem
B) Secondary growth is absent
C) They are found in monocot root
D) Xylem and phloem are not separated by cambium

Correct Answer: A) They are present in dicot stem

Explanation:
An **open vascular bundle** contains a strip of **cambium** between the xylem and phloem, which allows for **secondary growth** (increase in girth or thickness of the stem).

- Option A is correct: **Dicot stems** have open vascular bundles, enabling secondary growth.
- Option B is incorrect: Open vascular bundles are capable of secondary growth; it is **closed vascular bundles** (typically found in monocots) that lack secondary growth.
- Option C is incorrect: **Monocot roots** do not exhibit open vascular bundles.
- Option D is incorrect: In open vascular bundles, **xylem and phloem are separated by cambium**, which is essential for secondary growth.

25. Open vascular bundle and secondary growth are present in:

a) Monocot stem
b) Monocot root
c) Dicot stem
d) — *(Option incomplete)*

Correct Answer: c) Dicot stem

Explanation:

- **Open vascular bundles** have a **vascular cambium** between the xylem and phloem, which facilitates **secondary growth** (increase in thickness).
- **Dicot stems** possess such vascular bundles, allowing them to undergo secondary growth through the activity of the cambium.
- **Monocot stems and roots** generally have **closed vascular bundles** (no cambium), so they do **not show secondary growth**.

Hence, the correct answer is option c) Dicot stem

26. **Match the Following:**

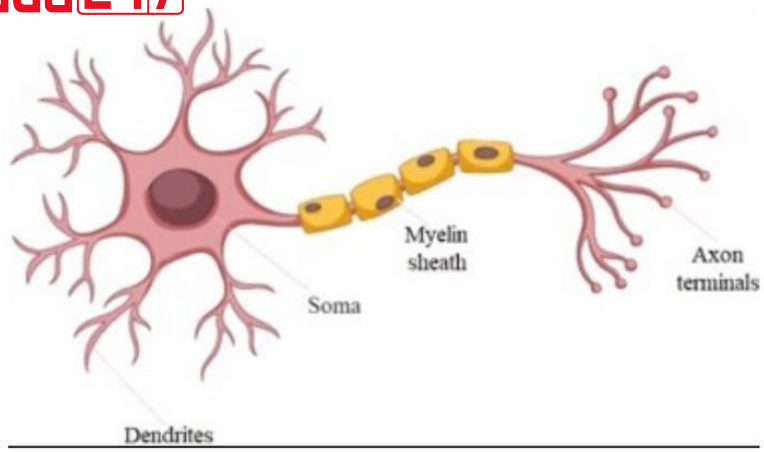
Column A	**Column B**
1. Delivery of baby	a. Parturition
2. Embryo development in female body	b. Gestation
3. Introducing sperm into female tract	c. Insemination
4. Gamete production	Gametogenesis

Matching:

1 → a. Parturition
2 → b. Gestation
3 → c. Insemination

Conclusion:
Hence, the correct answer is **option 1-a, 2-b, 3-c**

27



Name A,B, C

a is the **Dendrite**

b is the **Soma (cell body)**

c is the **Axon**

28. **Why is the activity of juxtaglomerular (JG) cells required?**
a) To increase blood glucose levels
b) To regulate blood pressure and blood volume
c) To reabsorb urea from urine
d) To digest proteins in the stomach

Correct Answer: b) To regulate blood pressure and blood volume

Explanation:
Juxtaglomerular (JG) cells are specialized cells located in the walls of the afferent arterioles of the kidneys. Their primary role is to **monitor blood pressure** and **sodium concentration**. When blood pressure drops or sodium levels fall, these cells secrete **renin**, an enzyme that activates the **renin-angiotensin-aldosterone system (RAAS)**.

This system leads to:

- **Vasoconstriction** (narrowing of blood vessels), which increases blood pressure
- **Aldosterone release**, promoting sodium and water reabsorption, and increasing blood volume

Therefore, JG cells are essential for maintaining **blood pressure and fluid balance** in the body.

- Option **A** is incorrect: JG cells have no role in glucose metabolism.
- Option **C** is incorrect: Urea reabsorption occurs passively in parts of the nephron and is not regulated by JG cells.

- Option **d** is incorrect: Protein digestion is carried out by enzymes like pepsin in the stomach, not by kidney cells.

Hence, the correct answer is option **b) To regulate blood pressure and blood volume**.

29. **What is the function of renin secreted by juxtaglomerular (JG) cells?**
a) Increase blood pressure
b) Increase blood volume
c) Decrease blood volume
d) a & b

Correct Answer: d) a & b

Explanation:
Renin is an enzyme secreted by the **juxtaglomerular (JG) cells** of the kidneys in response to **low blood pressure**, **low sodium levels**, or **sympathetic nervous system stimulation**.

Renin initiates the **renin-angiotensin-aldosterone system (RAAS)**, which leads to:

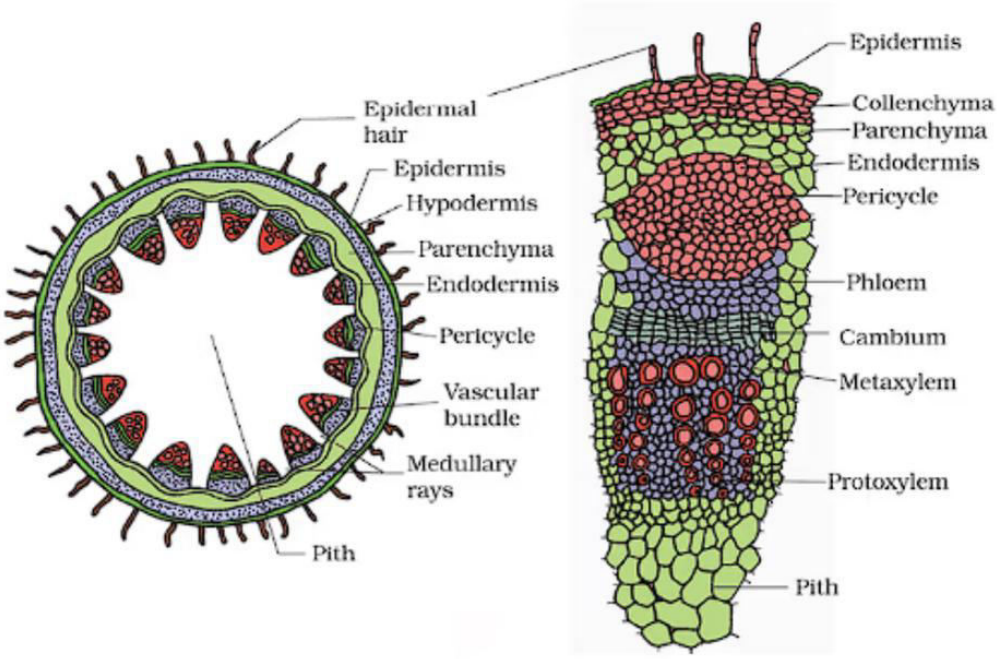
- The formation of **angiotensin II**, a powerful **vasoconstrictor** that **increases blood pressure**.
- The release of **aldosterone** from the adrenal cortex promotes **sodium and water reabsorption** by the kidneys, thereby **increasing blood volume**.

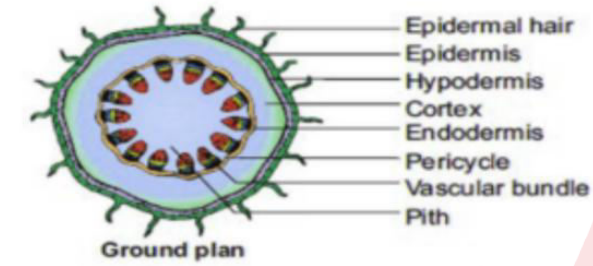
Together, these mechanisms help restore blood pressure and fluid balance.

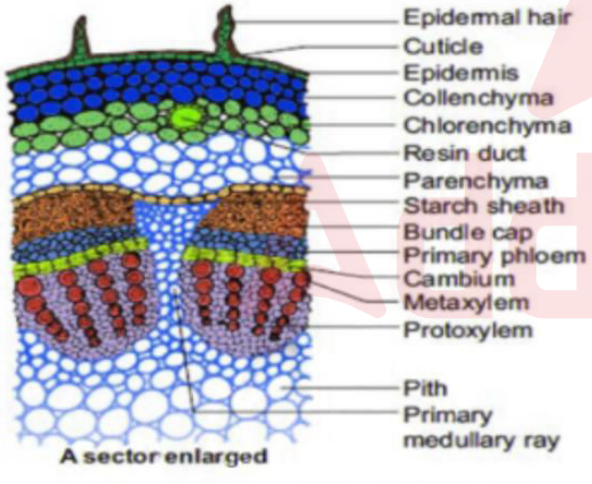
- Option **c** is incorrect: Renin does not decrease blood volume; it increases it.
- Option **d** is correct because renin helps **increase both blood pressure and blood volume**.

Hence, the correct answer is option **d) a & b**.

30.







What do these diagrams represent?

1st Image: Transverse Section of Dicot Stem

- **Source Label:** *Figure 12-4: Transverse section of Dicot stem*
- **Features identified:**
  Epidermal hair and **epidermis** (outermost protective layer)
  - **Hypodermis** (beneath epidermis, often collenchymatous)
  - **Cortex** (region containing parenchyma cells)
  - **Endodermis** (innermost layer of cortex)
  - **Pericycle, Phloem, Cambium, Xylem** (components of vascular bundles)
  - **Pith** (central parenchymatous tissue)

- **Vascular bundles are arranged in a ring** and are **open**, indicating **secondary growth potential** through cambium activity

2nd Image: Transverse Section of Monocot Stem

- **Features identified:**
  - **Epidermis** with **epidermal hairs.**
  - **Hypodermis** and **ground tissue** (not clearly separated into cortex, endodermis, or pith).
  - **Scattered vascular bundles** are found throughout the ground tissue
  - **Closed vascular bundles** (no cambium present), so **no secondary growth.**
  - **The bundle sheath** surrounds each vascular bundle.
  - The central region lacks a well-defined pith.

General Knowledge

Question 1. Who founded the Sikh Empire?

Answer: Maharaja Ranjit Singh

Explanation:

Maharaja Ranjit Singh established the Sikh Empire in the early 19th century. He unified various Sikh factions and ruled from 1801 to 1839, with Lahore as his capital. His leadership brought stability and prosperity to the region, making him one of the most prominent figures in Sikh history.

Question 2. Which is the smallest state of India in terms of area?

Answer: Goa

Explanation:

Goa is the smallest state in India by area, covering just 3,702 square kilometers. Despite its small size, it is a popular tourist destination known for its beautiful beaches, vibrant nightlife, and Portuguese heritage.

Question 3. Which is the longest river of India?

Answer: Ganga (Ganges)

Explanation:

The Ganga is the longest river in India, stretching about 2,525 kilometers. It flows through northern India and Bangladesh, playing a vital role in the country's agriculture, culture, and religion, and is considered sacred by Hindus.

Question 4. Who led the Jhansi Regiment?

Answer: Rani Lakshmibai

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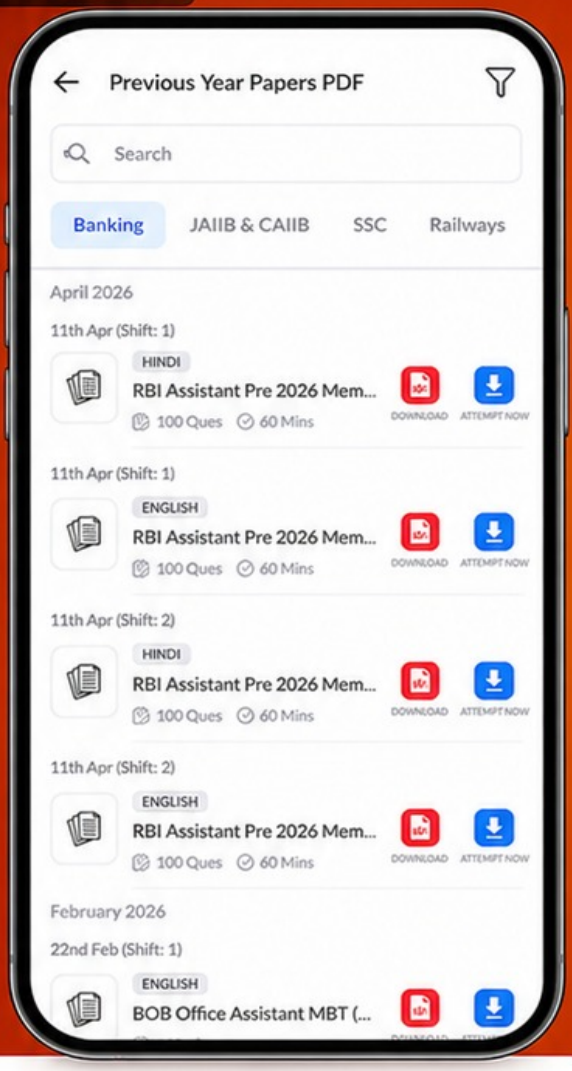

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Explanation:

Rani Lakshmibai, also known as the Queen of Jhansi, led the Jhansi Regiment during the Indian Rebellion of 1857. She became a symbol of resistance to British rule due to her courage and leadership in battle.

Question 5. What is the ratio of length and width of the Indian flag?

Answer: 3:2

Explanation:

The Indian national flag has a length-to-width (height) ratio of 3:2. This proportion is specified in the Indian Flag Code and must be maintained in all official representations of the flag to ensure uniformity.

Question 6. How long did Sunita Williams remain in space?

Answer: 195 days

Explanation:

Sunita Williams, an astronaut of Indian origin, spent 195 days in space during her mission aboard the International Space Station (ISS) in 2006–07. At the time, this was a record for the longest single spaceflight by a woman.

Question 7. What is India's highest gallantry award?

Answer: Param Vir Chakra

Explanation:

The Param Vir Chakra is India's highest military decoration, awarded for the highest degree of valor or self-sacrifice in the presence of the enemy. It is equivalent to the Medal of Honor in the United States and the Victoria Cross in the United Kingdom.

Question 8. Who is called the Missile Man of India?

Answer: Dr. A.P.J. Abdul Kalam

Explanation:

Dr. A.P.J. Abdul Kalam is known as the Missile Man of India for his significant contributions to India's missile development programs, including the Agni and Prithvi missiles. He later served as the 11th President of India and inspired millions with his vision for the nation.