Yakeen NEET 2.0 (2026)

Practice Test - 02

DURATION : 180 Minutes | **DATE : 22/06/2025** | **M. MARKS : 720**

Topics Covered

Physics :	Basic Maths & Calculus (Mathematical Tools) (Complete Chapter), Vectors (Complete Chapter).
Chemistry :	Some Basic Concept of Chemistry, (Complete Chapter), Redox Reaction (Complete Chapter).
Biology :	**(Botany):** Cell - The Unit of Life (Complete Chapter). **(Zoology):** Structural Organization in Animals: Tissues, Animal Tissues, Epithelium Tissue, Cell Junctions, Connective Tissue, Muscular Tissue, Nervous Tissue, FROG.

General Instructions:

1. Immediately fill in the particulars on this page of the test booklet.
2. The test is of **180 minutes** duration and the Test Booklet contains **180** multiple choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **45** questions in each subject
3. The test booklet consists of **180** questions. The maximum marks are **720**.
4. There is only **one correct** response for each question.
5. Each correct answer will give 4 marks while 1 Mark will be deducted for a wrong MCQ response.
6. No student is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc. inside the examination room/hall.
7. Use of white fluid for correction is **not permissible** on the **Answer Sheet**.
8. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. However, the candidates are allowed to take away this Test Booklet with them.

Answer Key

Q1	(2)
Q2	(4)
Q3	(2)
Q4	(1)
Q5	(2)
Q6	(3)
Q7	(4)
Q8	(3)
Q9	(4)
Q10	(2)
Q11	(4)
Q12	(2)
Q13	(1)
Q14	(2)
Q15	(3)
Q16	(2)
Q17	(1)
Q18	(1)
Q19	(1)
Q20	(2)
Q21	(4)
Q22	(4)
Q23	(3)
Q24	(1)
Q25	(1)
Q26	(2)
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Q176 (3)
Q177 (3)
Q178 (3)
Q179 (2)
Q180 (2)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

$$\frac{dy}{dx} = \frac{1}{2}\cos\left(x^2\right)(2x)$$
$$\frac{dy}{dx} = x\cos x^2$$

Video Solution:

Q2 Text Solution:

All the equation given in column I are equation of straight line,

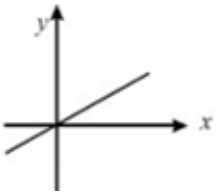
Straight line equation is given as

$y = mx + c$

Were m is slope, c is y intercept

(i) y = 4x

Here m = 4, The line will pass through origin and have positive slope of = 4

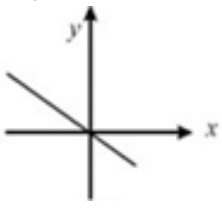


$i \to (a)$

(ii) y = – 6x

m = – 6

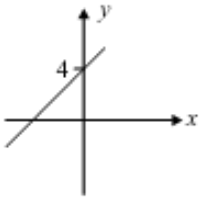
This line pass through origin and have negative Slope of –6



$ii \to b$

(iii) $y = x + 4$

Comparing it with $y = mx + c$



Here $m = 1$, $c = 4$

$iii \to (c)$

(iv) $y = -2x + 4$

$m = -2 \quad c = 4$

(negative slope)

$iv \to d$

Video Solution:

Q3 Text Solution:

$= [+\sin x]_{-\pi/2}^{\pi/2} = [\sin\pi/2 - (\sin(-\pi/2))]$

$= [\sin\pi/2 + \sin\pi/2] = 2$

Video Solution:

Q4 Text Solution:

$\sin 37° = \frac{3}{5}$, $\cos 37° = \frac{3}{5}$

$\Rightarrow \sin 37° \times \cos 53° = \frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$

Video Solution:

Q5 Text Solution:

$W = \vec{F} \cdot \vec{S} = -2J$

[New NCERT 11th Page No. 117]

Video Solution:

Q6 Text Solution:

$\vec{a} \times \vec{b} = \left|\vec{a}\right|\left|\vec{b}\right| \sin\theta$

If $\sin\theta$ is maximum then cross product of two vectors is maximum,

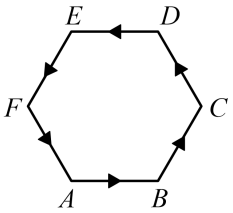
so $\theta = 90^\circ$

Video Solution:

Q7 Text Solution:

If n vectors are represented by adjacent sides of n sided polygon taken in same order in both direction and magnitude, then the resultant is a null vector.

For example,



$\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD} + \overrightarrow{EF} + \overrightarrow{FA} = O$

Resultant of these vectors is a null vector.

Video Solution:

Q8 Text Solution:

(C)

(i)

$\log_e 125 + \log_e 4 - 2 \log_e 5$

$= \log_e 5^3 + \log_e 4 - 2 \log_e 5$

$[\because \log_e a^m = m \log_e a]$

$= 3\log_e 5 + \log_e 4 - 2\log_e 5$

$= \log_e 5 + \log_e 4 = \log_e(20)$

$[\because \log_e(ab)] = \log_e a + \log_e b]$

(ii)

$\log_e 16 = \log_e 2^4 = 4\log_e 2$

(iii)

$\log_{10} 10 = 1 \quad [\because \log_a a = 1]$

(iv)

$\log_2 16 = \log_2 (2)^4 = 4\log_2 2 = 4$

Video Solution:

Q9 Text Solution:

$m = \tan 90^\circ = \infty$

Video Solution:

Q10 **Text Solution:**

$R = F = \sqrt{F^2 + F^2 + 2F^2\cos\theta}$

$\cos\theta = \frac{1}{2}$

$\therefore \quad \theta = 120^\circ$

Video Solution:

Q11 **Text Solution:**

If two vectors $\vec{A}$ and $\vec{B}$ are given then range of their resultant can be written as

$\left(\vec{A} - \vec{B}\right) \leq \vec{R} \leq \left(\vec{A} + \vec{B}\right)$.

i.e.,

$\vec{R}_{\max} = \vec{A} + \vec{B}$ and $\vec{R}_{\min} = \vec{A} - \vec{B}$

If magnitude of $\vec{B} = 1$ and that of $\vec{A} = 4$ then the magnitude of resultant will lie in between 3N and 5N. It can never be 2N.

Video Solution:

Q12 **Text Solution:**

Concept based

Video Solution:

Q13 **Text Solution:**

$(1+x)^n = 1 + nx$

$(1+x)^{1/2} = 1 + \frac{1}{2}x$

Video Solution:

Q14 **Text Solution:**

$\sqrt{3}y = 3x + 4$

$y = \sqrt{3}x + \frac{4}{\sqrt{3}}$

Slope = $\sqrt{3}$

Video Solution:

Q15 **Text Solution:**

$\cos\theta = \frac{\vec{A}\cdot\vec{B}}{\left|\vec{A}\right|\cdot\left|\vec{B}\right|}$

Video Solution:

Q16 **Text Solution:**

$\text{Component of } \vec{V} \text{ along } \vec{R} = \frac{\vec{V}\cdot\vec{R}}{|\vec{R}|}$

$= \frac{3\times3-4\times2}{\sqrt{3^2+(-4)^2}} = \frac{1}{5}$

Video Solution:

Q17 **Text Solution:**

Resultant of two vector will be maximum when $\theta = 0$ and $R = a + b$.

Video Solution:

Q18 **Text Solution:**

$e^{-\infty} = 0$

Video Solution:

Q19 **Text Solution:**

Magnitude of components are F cos θ & F sin θ,

as cos θ < 1 and sin θ < 1.

∴ Magnitude of components < F

In case vector is along x-axis.

Its component along x-axis will

be equal to its magnitude.

Video Solution:

Q20 **Text Solution:**

$\frac{d}{dx}\sin 7x$

$\frac{d}{dx}\sin ax = a\cos ax$

$\frac{d}{dx}\sin 7x = 7\cos 7x$

Video Solution:

Q21 **Text Solution:**

$R = \sqrt{a^2 + b^2}$ when $\theta = 90^0$

$\Rightarrow \quad R = 10N$

Video Solution:

Q22 **Text Solution:**

Unit vector is equal to ratio vector to magnitude of vector

Video Solution:

Q23 **Text Solution:**

$y = \ln x + e^x$

$\frac{dy}{dx} = \frac{1}{x} + e^x$

Video Solution:

Q24 **Text Solution:**

$$\log_e^{15} = \log_e(5 \times 3)$$
$$= \log_e 5 + \log_e 3$$

Video Solution:

Q25 **Text Solution:**

$\frac{P}{B} = \frac{P}{H}$

$B = H = 3$

Video Solution:

Q26 **Text Solution:**

$\log_2 16 = \log_2 2^4 = 4$

Video Solution:

Q27 **Text Solution:**

$\cos 1^\circ \simeq \cos 0 = 1$

Video Solution:

Q28 **Text Solution:**

Theory Based

Video Solution:

Q29 **Text Solution:**

$y = 2u^3$

$y = 2(8x - 1)^3$

$\frac{dy}{dx} = 2\left[3(8x-1)^2 8\right]$

$\frac{dy}{dx} = 48(8x-1)^2$

Video Solution:

Q30 **Text Solution:**

Resultant of two vectors is given by,

$R = \sqrt{A^2 + B^2 + 2AB\cos\theta}$

If $\theta \uparrow$, then $\cos\theta \downarrow$

So, R will decrease.

Video Solution:

Q31 **Text Solution:**

Let that the vector is $\vec{C}$

$\vec{C} + \hat{i} - 3\hat{j} + 2\hat{k} = 3\hat{i} - 6\hat{j} + 10\hat{k}$

$\Rightarrow \quad \vec{C} = \left(2\hat{i} - 3\hat{j} + 8\hat{k}\right)$

Video Solution:

Q32 **Text Solution:**

For 17 *N* both the vector should be parallel *i.e.* angle between them should be zero.

For 7 *N* both the vectors should be antiparallel *i.e.* angle between them should be 180°.

For 13 *N* both the vectors should be perpendicular to each other *i.e.* angle between them should be 90°.

Video Solution:

Q33 **Text Solution:**

Dot product with that vector = zero

Video Solution:

Q34 **Text Solution:**

$\Rightarrow \frac{dy}{dx} = \frac{d}{dx}(\sin x)^2$

$= 2(\sin x)^{2-1}\frac{d}{dx}\sin x$

by Chain rule

= 2 sin *x* cos *x*

Video Solution:

Q35 **Text Solution:**

$\vec{A} - 2\vec{B} + 2\vec{C} = \left(2\hat{i} + \hat{j}\right) - 2\left(3\hat{j} - \hat{k}\right)$

$+ 3\left(6i - 2\hat{k}\right)$

$2\hat{i} + \hat{j} - 6\hat{j} + 2\hat{k} + 18\hat{i} - 6\hat{k} = 20\hat{i} - 5\hat{j}$

$- 4\hat{k}$

Video Solution:

Q36 **Text Solution:**

As θ increases from 0° to 90°,

θ = 0°, cos 0° = 1

$\theta = 30°, \cos 30° = \frac{\sqrt{3}}{2}$

$\theta = 45°, \cos 45° = \frac{1}{\sqrt{2}}$

θ = 90°, cos 90° = 0

As θ increases from 0° to 90°, cosθ decreases

Video Solution:

Q37 **Text Solution:**

We know that ,

$\int e^{kx}dx = \frac{e^{kx}}{k} + c$

Hence ,

$\int e^{5x}dx = \frac{e^{5x}}{5} + C$

Video Solution:

Q38 **Text Solution:**

$$\left|\overrightarrow{A}\right| = \sqrt{(A_x)^2 + (A_y)^2 + (A_z)^2} = \sqrt{29}$$

Video Solution:

Q39 **Text Solution:**

Conceptual

Video Solution:

Q40 **Text Solution:**

For the proportionality $y \propto x^2$, the graph is a **parabola** opening upward. Visually, among the given plots:

- **(A)** shows a rising curve that is more "steeply curved" at larger x values — characteristic of x^2.
- **(B)** looks less steep (it could represent $y \propto \sqrt{x}$).
- **(C)** looks like $y \propto \frac{1}{x}$.
- **(D)** is a straight line ($y \propto x$).

Hence, the **correct choice** for $y \propto x^2$.

Video Solution:

Q41 **Text Solution:**

From $\mathbf{A} + \mathbf{B} = \mathbf{C}$, taking magnitudes and squaring gives

$$|\mathbf{C}|^2 = (\mathbf{A} + \mathbf{B}) \cdot (\mathbf{A} + \mathbf{B}) = A^2 + B^2 + 2AB\cos\theta.$$

From $A + B = C$ (magnitudes), we get

$$(A + B)^2 = A^2 + 2AB + B^2 = C^2.$$

Comparing these two expressions for C^2 forces

$$2AB\cos\theta = 2AB \implies \cos\theta = 1 \implies \theta = 0.$$

Video Solution:

Q42 **Text Solution:**

(3)

It has two roots

Video Solution:

Q43 **Text Solution:**

$10^2 + 10^3$

100 + 1000 = 1100

Video Solution:

Q44 **Text Solution:**

$(64)^{\frac{2}{3}} = 64 = 4^3$

$\left(4^3\right)^{\frac{2}{3}} = 4^{\frac{3\times2}{3}}$

$= 4^2$

= 16

Video Solution:

Q45 Text Solution:

(1)

$\int x^n dx = \frac{x^{n+1}}{n+1} + C$

Video Solution:

Q46 Text Solution:

- When water is electrolyzed, it decomposes. The reaction occurs as $2H_2O \rightarrow 2H_2 + O_2$
- Calcium carbonate's breakdown is not a redox process because there is no change in the oxidation number of any species.
- $CaCO_3(S) \rightarrow CaO + CO_2$
- so, A is false and R is true.

Q47 Text Solution:

- Reducing agent : donates electrons
- Oxidising agent : accepts electrons

[New NCERT Class 11th Page No. 11]

Video Solution:

Q48 Text Solution:

$NaHC_2O_4$ is behaving as acid and hence

E = $\frac{M}{1}$

Q49 Text Solution:

SO_3^{2-} →S is in + 4 oxidation state

$S_2O_4^{2-}$ →S is in + 3 oxidation state

$S_2O_6^{2-}$ →S is in + 5 oxidation state

Q50 Text Solution:

More negative value of electrode potential, more will be reducing power.

Q51 Text Solution:

In the reaction,

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$,

the ratio by volume of N_2, H_2 and NH_3 is 1: 3: 2. This illustrates the law of gaseous volumes or Gay Lussac's law of combining volumes of gases.

Video Solution:

Q52 Text Solution:

(3)

Number of moles of $H_2O = \frac{36}{18} = 2$ moles

H has zero neutron and O has 8 neutrons.

Number of neutrons in 2 moles of

$H_2O = 2 \times 8 \times N_A = 16\ N_A$

Video Solution:

Q53 Text Solution:

(2)

Number of atoms = 0.2 × 3 × 6.022 × 10^{23}

= 3.613 × 10^{23}

Video Solution:

Q54 Text Solution:

The following reaction takes place on combustion of methane:

$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$

Comparing stoichiometric co-efficients:

1 mole of CH_4 gives 2 moles of H_2O.

16gm of CH_4 gives 36gm of H_2O.

H_2O is one of the product of combustion of Methane.

Hence, A is false and R is true.

Q55 Text Solution:

- 22.4 L of He gas have N_A atoms of He at 1 atm and 273 K
- 1 mole of any gas occupy 22.4 L at 1 atm and 273 K.

[New NCERT Class 11th Page No. 18]

Video Solution:

Q56 Text Solution:

Strength = $0.9\ g\ L^{-1}$

Molarity = $\frac{0.9}{180}$ mol/l = 0.005 M

[NCERT 2024-25 Class 11th Page No. 21]

Video Solution:

Q57 Text Solution:

Number of moles of glucose $= \frac{3}{180} = \frac{1}{60}$

Weight of solvent = 53 – 3 = 50 g

Molality of solution = $\frac{\frac{1}{60}}{50} \times 1000$ = 0.33 m

Video Solution:

Q58 Text Solution:

Law of conversation of mass states that mass can neither be created nor be destroyed in a chemical reaction.

Video Solution:

Q59 Text Solution:

Mass percent of x $= \frac{\text{Mass of x}}{\text{Mass of solution}} \times 100$

$= \frac{5g}{5g \text{ of x} + 20\ g \text{ of water}} \times 100 = 20\%$

[NCERT 2024-25 Class 11th Page No.10]

Q60 Text Solution:

Correct Answer - A

Molality $= \frac{\text{Number of moles of solute}}{\text{weight of solvent (in kg)}}$

If number of moles of solute $= 1$

Weight of solvent $= 1$ kg then, molality = 1, i.e., one molal

For glucose ($C_6H_{12}O_6$), molecular weight = 180

number of moles $= \frac{180}{180} = 1$, weight of water $= 1$ kg

Hence, molality of the solution is one.

.[New NCERT Class 11th Page No. 24]

Video Solution:

Q61 Text Solution:

A + 2B $\rightarrow$C

According to stoichiometry of reaction, 1 mole of A reacts with 2 mole of B and form 1 mole of C.

So, 5 mole of A will react with 10 mole of B.

So, 2 mole of B produce =1 mole of C

So, 8 mole of B produce = 4 mole of C.

Video Solution:

Q62 Text Solution:

Molar mass = density × volume

1.25 × 22.4

= 28 g

C_2H_4 has 28 g mass.

Video Solution:

Q63 Text Solution:

The statement refers to the **Law of Multiple Proportions**, which states that if two elements combine to form more than one compound, the masses of one element that combine with a fixed mass of the other element are in the ratio of small whole numbers. For example, carbon and oxygen form two compounds: carbon monoxide (CO), where 12 g of carbon combines with 16 g of oxygen, and carbon dioxide (CO_2), where 12 g of carbon combines with 32 g of oxygen. The oxygen masses (16:32) form a simple ratio of 1:2, illustrating the law. This law supports the idea that chemical compounds are made of atoms in fixed, whole-number ratios.

Video Solution:

Q64 Text Solution:

In $Mg_3(PO_4)_2$; 8 moles of O-atoms are present in 1 mole of $Mg_3(PO_4)_2$.

Hence, 0.25 mole of O-atom are contained in

$= \frac{1}{8} \times 0.25$

$= 3.125 \times 10^{-2}$ mol

Q65 Text Solution:

Molarity = Mol/L

Mole fraction = Unit less

Amount of substance = Mol

Molality = mol/kg

Video Solution:

Q66 Text Solution:

All correct representation are:

1.2345×10^4

12.345×10^3

123.45×10^2

1234.5×10^1

Video Solution:

Q67 Text Solution:

From the balanced equation, 2 moles of SO_2 reacts with 1 mole of O_2 . As 1 mole of SO_2 is present, it will be the limiting reagent. Thus, the amount of SO_3 formed will be 1 mole.

Q68 Text Solution:

(4)

- The given reaction: $4O_2^x + 2H_2O \rightarrow 4\,OH^- + 3O_2$,
- The total charge of LHS is $4x$, as water molecule is electrically neutral , so the charge of water molecule is zero.
- The total charge of RHS is -4 , as here the charge of oxygen is zero.
- Hence ,$4x = -4 \Rightarrow x = -1$.
- Hence $x = -1$ and the species is superoxide as the formula of superoxide is O_2^{-1}.
- The correct option is [4].

Video Solution:

Q69 Text Solution:

H_2S undergoes oxidation while Cl_2 undergoes reduction.

Video Solution:

Q70 Text Solution:

$HIO_4 \Rightarrow +1 + x + 4(-2) = 0$

x = +7

$H_3IO_5 \Rightarrow 3 + x + 5(-2) = 0$

x = +7

$H_5IO_6 \Rightarrow 5 + x + 6(-2) = 0$

x = +7

Video Solution:

Q71 Text Solution:

(3)

(1) $\overset{+7}{MnO_4^-} \rightarrow \overset{+4}{MnO_2} + \overset{0}{O_2}$ (redox)

(2) $\overset{0}{Cl_2} \rightarrow \overset{-1}{HCl} + \overset{+1}{HCl}O$ (redox)

(3) $\overset{+6}{CrO_4^{2-}} + \overset{+1}{2H^+} \longrightarrow \overset{+6}{Cr_2O_7^{2-}} + \overset{+1}{H_2O}$ (No change in oxidation)

(4) $\overset{+7}{MnO_4^-} + Fe^{2+} + H^+ \longrightarrow \overset{+2}{Mn} + Fe^{3+} + H_2O$ (redox)

Video Solution:

Q72 Text Solution:

$Cr_2O_3 + 2Al \xrightarrow{\Delta} Al_2O_3 + 2Cr$

[NCERT 2024-25 Class 11th Page No. 241]

Q73 Text Solution:

A disproportionation reaction is a type of redox reaction in which a single substance is simultaneously oxidized and reduced, forming two different products.

$2KOH + \overset{0}{Cl_2} \rightarrow \overset{-1}{KCl} + KO\overset{+1}{Cl} + H_2O$

Video Solution:

Q74 **Text Solution:**

I^- can never act as an oxidizing agent.

Oxidizing agent undergoes reduction.

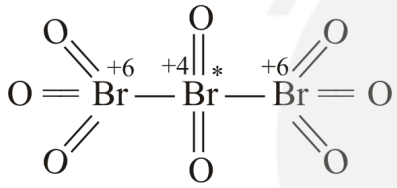
Q75 **Text Solution:**

(3)

- The standard electron potential is measured at 25°C
- $E^0_{H^+/H_2} = 0.0 \text{ volt}$

[NEW NCERT 11th Part-II Page No. 251]

Q76 **Text Solution:**



Structure of Br_3O_8 (tribromooctaoxide)

Video Solution:

Q77 **Text Solution:**

$\because E^o_{Zn^{2+}|Zn} > E^o_{Al^{3+}|Al}$

$\therefore Al^{3+}$ is a better reducing agent.

Q78 **Text Solution:**

Reduction reaction of H_2O_2 is:

$H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$

n–factor = 2

Here, equivalent mass of $H_2O_2 = \frac{M}{2}$

[New NCERT Class 11th Page No. 237]

Video Solution:

Q79 **Text Solution:**

$$\begin{gathered}\left[MnO_4^- + 8H^+ + 5e^- \rightarrow Mn^{2+} + 4H_2O\right] \times 2 \\ \left[C_2O_4^{2-} \rightarrow 2CO_2 + 2e^-\right] \times 5 \\ \hline 2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O\end{gathered}$$

[New NCERT Class 11th Page No.]

Video Solution:

Q80 **Text Solution:**

In $CaOCl_2$, Cl is present in two oxidation states:- +1 & –1

Video Solution:

Q81 **Text Solution:**

In Br_2, each bromine is at oxidation state 0. In the bromate ion (BrO_3^-), bromine is at +5. Hence, in the conversion $Br_2 \rightarrow BrO_3^-$, bromine's oxidation number increases from 0 to +5.

Video Solution:

Q82 Text Solution:

Fluorine (F_2) is the most electronegative element, making it the strongest oxidising agent among the species listed. It oxidises other elements by readily taking electrons, more powerfully than O_2, Br_2, or I_2.

Video Solution:

Q83 Text Solution:

- The given equation: $2\,Fe^{3+}_{(aq.)} + Sn^{2+}_{(aq)} \rightarrow 2\,Fe^{2+}_{(aq)} + A$
- In the above reaction Fe^{3+} is reduced to Fe^{2+} by gaining electrons.
- The reduction half reaction is : $2\,Fe^{3+} + 2e^- \longrightarrow 2\,Fe^{2+}$.
- So,Sn^{2+} will lose two electron to balance the redox reaction and becomes Sn^{4+}
- so, the oxidation half reaction will be, $Sn^{2+} \longrightarrow Sn^{4+} + 2e^-$
- Hence the redox reaction: $2\,Fe^{3+}_{(aq)} + Sn^{2+}_{(aq)} \longrightarrow 2\,Fe^{3+}_{(aq)} + Sn^{4+}_{(aq)}$
- 'A' is $Sn^{4+}_{(aq)}$.
- The correct option is [3].

Q84 Text Solution:

$Sn^{2+} \rightarrow Sn^{4+} + 2e^-$. In this reaction Sn^{2+} change in Sn^{4+} it is called an oxidation reaction.

Q85 Text Solution:

$2MnO + 5PbO_2 + 10HNO_3$
$\rightarrow 2HMnO_4 + 5Pb(NO_3)_2 + 4H_2O$

Video Solution:

Q86 Text Solution:

$Ca(OH)_2 + H_2SO_4 \rightarrow CaSO_4 + 2H_2O$
$Ca(OH)_2$ is Limiting reagent
1 mole of $Ca(OH)_2$ give
1 mole of $CaSO_4$.
$\therefore$ 0.2 Mole of $Ca(OH)_2$ give
0.2 mole of $CaSO_4$.

Video Solution:

Q87 Text Solution:

$A_2 + B_2 \rightarrow AB_3$
Applying POAC on A atom,
moles of A atom in A_2 = moles of A atoms in AB_3
moles of A atom in A_2 = 2 moles
moles of A atoms in AB_3 = 1 moles
2 moles of A_2 = 1 mole of AB_3
$\Rightarrow$ moles of $A_2 = \frac{3}{2}$ mole = 1.5 mole

Q88 Text Solution:

22.4 L of O_2 contains = 6.022×10^{23} molecules
1L of O_2 contains = $\frac{6.022\times10^{23}}{22.4}$ molecules
5.6 L of O_2 contains = $\frac{6.022\times10^{23}}{22.4} \times 5.6$ molecules
Atoms of O in 5.6 L = $\frac{6.022\times10^{23}\times5.6\times2}{22.4}$
= 3.011×10^{23} atoms

Q89 Text Solution:

2.653×10^4	4
1.00368	6
65.4	3
0.36	2

Q90 Text Solution:

Average atomic mass of boron = $\frac{19\times10+81\times11}{100}$

= 10.8 u

[NCERT 2024-25 Class 11th Page No. 28]

Video Solution:

Q91 Text Solution:

Correct option: 3 — Inner part of the membrane

In the phospholipid bilayer, each molecule is amphipathic: the hydrophilic phosphate heads face the aqueous exterior (extracellular fluid) and interior (cytosol), while the hydrophobic fatty-acid tails point inward toward one another, creating the membrane's non-polar core (NCERT Class XI, Chapter 8).

[NCERT 11th Edition (2025-26) Page No. 93]

Q92 Text Solution:

Polysomes (polyribosomes) are clusters of ribosomes simultaneously translating a single mRNA strand. Translation occurs in the cytoplasm in prokaryotes and in the cytosol (or on rough ER) after mRNA exits the nucleus in eukaryotes, not in the nucleoplasm.

[NCERT 11th Edition (2025-26) Page No. 91]

Q93 Text Solution:

Correct option: 4 — Centrosome and ribosome

Ribosomes and the centriolar pair of the centrosome are non-membrane-bound organelles in animal cells, unlike gas vacuoles (found in prokaryotes), chromatophores (photosynthetic bacteria/algae), or peroxisomes (single-membrane-bound). (NCERT XI, Ch. 8)

[NCERT 11th Edition (2025-26) Page No. 80]

Q94 Text Solution:

Wrong match: 2 — Fimbriae → Help in movement of bacteria

Fimbriae are short, numerous surface appendages that aid in adhesion, not motility (movement is via flagella). The other matches are correct as per NCERT descriptions.

[NCERT 11th Edition (2025-26) Page No. 91]

Q95 Text Solution:

Answer: 1 — Statement I is correct but Statement II is incorrect.

- **Statement I:** Correct. The tonoplast (vacuolar membrane) contains active transporters that pump ions (e.g., H^+, Ca^{2+}) into the vacuole against their concentration gradients, maintaining turgor and pH (NCERT XI, Ch. 8).
- **Statement II:** Incorrect. Mitochondria possess their own 70S ribosomes, tRNAs, rRNAs, and enzymes, enabling in-organelle protein synthesis (NCERT XI, Ch. 8).

[NCERT 11th Edition (2025-26) Page No. 96, 97]

Q96 Text Solution:

Correct option: 4 — Radial spoke

In the 9 + 2 axoneme of eukaryotic flagella/cilia, each peripheral microtubule doublet is connected to the central microtubule pair's sheath by protein projections called radial spokes.

[NCERT 11th Edition (2025-26) Page No. 99]

Q97 Text Solution:

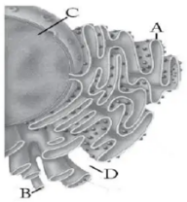
Correct option: 2 — Theodore Schwann

Schwann reported that cells had a thin outer layer which is today known as plasma membrane.

[NCERT 11th Edition (2025-26) Page No. 88]

Q98 Text Solution:

Correct option: 1 — A = Rough ER (V), B = Smooth ER (IV), C = Nucleus (VIII), D = Cytoplasm (III)



[NCERT 11th Edition (2025-26) Page No. 88]

Q99 Text Solution:

The term cisternae is associated with the endoplasmic reticulum and the Golgi apparatus, not mitochondria or chloroplasts.

[NCERT 11th Edition (2025-26) Page No. 98]

Q100 Text Solution:

Correct option: 4 - Does not get stained with any dye → Wrong statement

Explanation:

- Chromatin **does get stained** with basic dyes, which is how it was first observed.
- It is made of **DNA and histone proteins**, is a **nucleoprotein fiber**, and was named by **Flemming**.

[NCERT 11th Edition (2025-26) Page No. 100]

Q101 Text Solution:

Correct option: 3 — Four

Correct statements:

1. ✓ (i) Mitochondria are sausage-shaped or cylindrical.
2. ✓ (ii) Size is correctly given.
3. ✓ (iii) Mitochondria divide by fission.
4. ❌ (iv) *Incorrect* — Mitochondria are sites of aerobic respiration, not anaerobic.
5. ✓ (v) Both membranes have specific enzymes.

[NCERT 11th Edition (2025-26) Page No. 97]

Q102 Text Solution:

Correct option: 2 — Plasmid DNA is used to monitor bacterial transformation.

Explanation:

- Plasmid DNA is **extrachromosomal**, circular DNA found in many **bacteria**, not in all eukaryotes.
- It carries genes that may confer traits like **antibiotic resistance** (phenotypic characters).
- It is **not the main genomic DNA** and is **smaller** than genomic DNA (NCERT XI, Ch. 8).

[NCERT 11th Edition (2025-26) Page No. 90]

Q103 Text Solution:

Correct option: 4 — A: F, B: F, C: T,D:T

Explanation:

- **(i) false** — Protein synthesis in eukaryotic cells occurs on **ribosomes**, mainly in the **cytoplasm** and on **rough ER**, not inside the nucleus.
- **(ii) False** — Ribosomes were first observed as **dense particles** (not necessarily granular) by **Palade** using electron microscopy.
- **(iii) True** — Sedimentation coefficient (S unit) reflects **size and density** indirectly, affecting how fast particles sediment during centrifugation.
- **(iv) True —**Ribosomes are composed of RNA (ribonucleic acid) and protein**.**

[NCERT 11th Edition (2025-26) Page No. 98]

Q104 Text Solution:

Correct option: 3 — Was first observed by Camillo Golgi

Explanation:

- The **Golgi apparatus** is responsible for the **formation of glycoproteins and glycolipids**.
- It was first observed by **Camillo Golgi** in 1898.

[NCERT 11th Edition (2025-26) Page No. 99]

Q105 Text Solution:

Correct option: 4 — I, III and IV

Explanation:

- **(I) True** — The cell wall provides protection, including from pathogens
- **(II) False** — The plasma membrane, not the cell wall, is selectively permeable
- **(III) True** — The cell wall plays a role in cell-to-cell interaction, especially via plasmodesmata
- **(IV) True —**The cell wall gives shapes to the cell

[NCERT 11th Edition (2025-26) Page No. 94]

Q106 Text Solution:

Correct option: 4 — Is always hard and thick → Incorrect statement

Explanation:

- The **glycocalyx** can be:
  - A **capsule** (thick and hard) **or**

- A **slime layer** (loose and thin)
- Hence, it is **not always hard and thick**.
- All other statements are correct as per **NCERT XI, Ch. 8**.

[NCERT 11th Edition (2025-26) Page No. 90]

Q107 Text Solution:
Correct option: 3 — Nucleolus
Explanation:

- The **nucleolus** is:
  - **Spherical** and located in the **nucleoplasm/ nuclear matrix**
  - **Not membrane-bound**
  - Site of **rRNA synthesis**
  - **Prominent** in cells actively engaged in **protein synthesis**

[NCERT 11th Edition (2025-26) Page No. 100]

Q108 Text Solution:
Correct option: 1 — A is true but R is false
Explanation:

- **Assertion (A): True** — In **prokaryotes**, ribosomes (70S) are **attached to the plasma membrane** via mRNA during translation (NCERT XI, Ch. 8).
- **Reason (R): False** — Prokaryotic ribosomes are **70S**, are about 15 nm by 20 nm.

[NCERT 11th Edition (2025-26) Page No. 91]

Q109 Text Solution:
Correct option: 4 — A - III, B - I, C - IV, D - II
Matching Explanation:

- **(A) Golgi apparatus → (III)** Help in oxidative phosphorylation
- **(B) Lysosomes → (I)** Formed by the process of packaging in Golgi apparatus
- **(C) Smooth endoplasmic reticulum → (IV)** Major site for synthesis of lipid
- **(D) Vacuole → (II)** Bound by a single membrane called tonoplast and occupy 90% volume of the cell in plant cells

[NCERT 11th Edition (2025-26) Page No. 95-96]

Q110 Text Solution:
Correct option: 3 — It is more numerous in cells that are actively involved in protein synthesis
Explanation:

- The labelled part A shows rough endoplasmic reticulum (RER).
- RER is studded with ribosomes (80S in eukaryotes) and is abundant in cells engaged in active protein synthesis (e.g., pancreatic cells).
- It is also a membrane-bound organelle, but option C is the most specific and correct as per.

[NCERT 11th Edition (2025-26) Page No. 95]

Q111 Text Solution:
Correct option: 1 — D → C → B → A
Chronological order:

1. **(D) Antonie van Leeuwenhoek** — First to observe living cells (1674)
2. **(C) Robert Brown** — Discovered the nucleus (1831)
3. **(B) Schleiden and Schwann** — Proposed cell theory (1838–1839)
4. **(A) Rudolf Virchow** — Stated that cells arise from pre-existing cells (1855)

[NCERT 11th Edition (2025-26) Page No. 87,88]

Q112 Text Solution:
Correct option: 1 — A - I, B - II, C - III, D - IV
Matching Explanation (NCERT XI, Ch. 8):

- **Mesosome → (I):** Infoldings of plasma membrane in bacteria
- **Plasmodesmata → (II):** Connections between plant cells
- **Centriole → (III):** Forms spindle fibers during cell division
- **Perinuclear space → (IV):** 10 to 50 nm

[NCERT 11th Edition (2025-26) Page No. 91,94,99,100]

Q113 Text Solution:
Correct option: 1 — A is true but R is false
Explanation:

- **Assertion (A): True — :** The nuclear envelope is interrupted by minute pores, which are formed by the fusion of its membrane.
- **Reason (R): False** — Nuclear pores **do not transport DNA** into the cytoplasm. They allow **RNA and proteins**, but **DNA remains in the nucleus**.

[NCERT 11th Edition (2025-26) Page No. 100]

Q114 Text Solution:
Correct option: 1 — I, III and IV only
Explanation:

- **(I) True** — Chloroplasts contain **chlorophyll** and carotenoid pigments and perform **photosynthesis**.
- **(II) False** — **Chromoplasts** are **colored** plastids (red, orange, yellow), not **colorless** and do **not store oils and fats**.
- **(III) True** — **Leucoplasts** (e.g., amyloplasts) are **colorless** and **store nutrients** like starch.
- **(IV) True** — **Stroma lamellae** connect **grana stacks** in chloroplasts.

[NCERT 11th Edition (2025-26) Page No. 97-98]

Q115 Text Solution:
Correct option: 3 — All plant and animal cells contain centrioles and plastids → Incorrect statement
Explanation:

- **Plastids** are present in **plant cells**, **not in animal cells**.
- **Centrioles** are present in **animal cells**, but **typically absent in higher plant cells**.

[NCERT 11th Edition (2025-26) Page No. 91]

Q116 Text Solution:
Correct option: 1 — A - I, B - II, C - III

- **(A) Thylakoid → (I):** Contains **chlorophyll pigments** and is the site of **light reactions**
- **(B) Stroma → (II):** Site of **enzyme activity** for **dark reactions** (Calvin cycle)
- **(C) Grana → (III): Stacks of thylakoids**

[NCERT 11th Edition (2025-26) Page No. 98]

Q117 Text Solution:
Correct option: 3 — The polar molecules require a carrier protein of the membrane to facilitate their transport across the membrane

[NCERT 11th Edition (2025-26) Page No. 99]

Q118 Text Solution:
Correct option: 1 — I, II, III are true
Explanation:

- **(I) True** — Eukaryotic ribosomes = **80S**, Prokaryotic ribosomes = **70S**
- **(II) True** — Each ribosome has **two sub-units**
- **(III) True** — 80S = **60S + 40S**, 70S = **50S + 30S**
- **(IV) and (V) are incorrect** — sub-unit values are wrong and **non-existent in reality**

[NCERT 11th Edition (2025-26) Page No. 98]

Q119 Text Solution:
Correct option: 4 — Both A and R are true and R is the correct explanation of A
Explanation:

- **Assertion (A): True** — The endoplasmic reticulum is a network of tiny tubular membrane-bound structures scattered in the cytoplasm.
- **Reason (R): True** — Endoplasmic reticulum contains tubules or cisternae.

[NCERT 11th Edition (2025-26) Page No. 95,102]

Q120 Text Solution:
Correct option: 2 — Toward the trans or maturing face
Explanation:

- Vesicles from the **ER** fuse with the **cis face** (forming face) of the **Golgi apparatus**.
- Proteins are then processed and transported **toward the trans face** (maturing face), which is involved in **sorting and packaging** them for delivery (NCERT XI, Ch. 8).

[NCERT 11th Edition (2025-26) Page No. 96]

Q121 Text Solution:

Correct option: 2 — Lysosomes contain hydrolytic enzymes; vacuoles contain water, sap and excretory product

Explanation:

- **Lysosomes** are membrane-bound organelles rich in **hydrolytic enzymes** that digest cellular waste.
- **Vacuoles** in plant cells store **water, sap, pigments, and waste products**.

[NCERT 11th Edition (2025-26) Page No. 96]

Q122 **Text Solution:**

Correct option: 4 — Chloroplast

Explanation:

- An **oval, double-membraned** organelle with **thylakoids** and **stroma** is characteristic of **chloroplasts**.
- Found in **mesophyll cells** of leaves, chloroplasts are the site of **photosynthesis**.

[NCERT 11th Edition (2025-26) Page No. 98]

Q123 **Text Solution:**

Correct option: 1 — I, II, and IV only

Explanation:

- **(I) True** — Chloroplasts have a **double membrane**, **circular DNA**, **70S ribosomes**, and enzymes for **protein synthesis**.
- **(II) True** — **Thylakoids** are arranged in **grana**, and their membranes enclose the **lumen**.
- **(III) False** — In eukaryotes,cilia and flagella are hair- like outgrowths of the cell membrane.
- **(IV) True** — The **cytoskeleton** includes **microtubules, microfilaments, and intermediate filaments**, helping with **cell shape and organization**.

[NCERT 11th Edition (2025-26) Page No. 98, 99]

Q124 **Text Solution:**

Centrosome is an organelle usually containing two cylindrical structures called centrioles. They are surrounded by amorphous pericentriolar materials.

[NCERT 11th Edition (2025-26) Page No. 99]

Q125 **Text Solution:**

Cilia are small structures which work like oars, causing the movement of either the cell or the surrounding fluid. Flagella are comparatively longer and responsible for cell movement.

[NCERT 11th Edition (2025-26) Page No. 99]

Q126 **Text Solution:**

Larger and more numerous nucleoli are present in cells actively carrying out protein synthesis.

[NCERT 11th Edition (2025-26) Page No. 100]

Q127 **Text Solution:**

Correct option: 3 — Both Statement I and Statement II are correct

Explanation:

- **Statement I: Correct** — A single human cell contains about 2 meters of DNA, packed into 46 chromosomes (23 pairs).
- **Statement II: Correct** — In the interphase nucleus, DNA exists as a loose network of chromatin, made of DNA and proteins .

[NCERT 11th Edition (2025-26) Page No. 101]

Q128 **Text Solution:**

The leucoplasts are the colourless plastids of varied shapes and sizes with stored nutrients.

[NCERT 11th Edition (2025-26) Page No. 97]

Q129 **Text Solution:**

Correct option: 1 — blue green and purple and green photosynthetic bacteria

Explanation:

- Gas vacuoles are found in cyanobacteria (blue-green algae) and photosynthetic bacteria (purple and green types).
- They help in buoyancy regulation, allowing bacteria to float at optimal depths for photosynthesis.

[NCERT 11th Edition (2025-26) Page No. 91]

Q130 **Text Solution:**

In case of an acrocentric chromosome the centromere is situated close to its end forming one extremely short and one very long arm,

whereas the telocentric chromosome has a terminal centromere.

[NCERT 11th Edition (2025-26) Page No. 101]

Q131 Text Solution:

Plastids are found in all plant cells and in euglenoides.

[NCERT 11th Edition (2025-26) Page No. 97]

Q132 Text Solution:

While both statements are true, the reason doesn't explain why the nucleolar content is continuous with nucleoplasm.Just being spherical and present in nucleoplasm doesn't automatically mean it's continuous.The real reason for the assertion is: "Because nucleolus is not membrane-bound."

[NCERT 11th Edition (2025-26) Page No. 100]

Q133 Text Solution:

All organisms are composed of cells and product of cells.The invention of the microscope and its improvement leading to the electron microscope revealed all the structural details of the cell.

[NCERT 11th Edition (2025-26) Page No. 87]

Q134 Text Solution:

The nucleus is enclosed by a nuclear envelope, a double membrane structure with nuclear pores.

[NCERT 11th Edition (2025-26) Page No. 102]

Q135 Text Solution:

Cell membrane Contains lipids, proteins, carbohydrates, and cholesterol.This is based on the fluid mosaic model of the membrane, which includes all four components.

[NCERT 11th Edition (2025-26) Page No. 93]

Q136 Text Solution:

Epithelial tissue has a free surface, which faces either a body fluid or the outside environment and thus provides a covering or a lining for some part of the body.

Q137 Text Solution:

All cells in the epithelium are held together with little intercellular material. Three types of cell junctions are found in the epithelium and other tissues. These are called tight, adhering, and gap junctions. Tight junctions help to stop substances from leaking across a tissue.

Q138 Text Solution:

Connective tissues, except blood, are characterized by the secretion of structural proteins like collagen and elastin by their cells. These fibers are the primary structural components of connective tissues, providing strength, elasticity, and flexibility.

Q139 Text Solution:

Adipose tissue's primary function is to store energy in the form of triglycerides, which are fats. When the body consumes more nutrients than it needs, the excess energy is converted into fat and stored in adipose tissue.

Q140 Text Solution:

The skeletal system is indeed composed of hard, non-pliable bones. These bones contain calcium salts and collagen fibers, which give them their strength and rigidity. The bone marrow in some bones is the site of production of blood cells.

Q141 Text Solution:

Cardiac muscle tissue is a contractile tissue present only in the heart. Cell junctions fuse the plasma membranes of cardiac muscle cells and make them stick together. Communication junctions (intercalated discs) at some fusion points allow the cells to contract as a unit, i.e., when one cell receives a signal to contract, its neighbours are also stimulated to contract.

Q142 Text Solution:

- Skeletal muscle tissue is closely attached to skeletal bones. In a typical muscle, such as the biceps, striated (striped) skeletal muscle fibres are bundled together in a parallel fashion.
- Smooth muscles are 'involuntary' as their functioning cannot be directly controlled. We usually are not able to make it contract merely by thinking about it, as we can do with skeletal muscles.

Q143 Text Solution:

Each muscle is made of many long, cylindrical fibres arranged in parallel arrays. These fibres are composed of numerous fine fibrils, called myofibrils. Muscle fibres contract (shorten) in response to stimulation, then relax (lengthen) and return to their uncontracted state in a coordinated fashion.

Q144 Text Solution:

The smooth muscle fibres taper at both ends (fusiform) and do not show striations.

Q145 Text Solution:

Neuroglia make up more than one half the volume of neural tissue in our body. The neuroglial cells protect and support neurons.

Q146 Text Solution:

- Dense irregular connective tissue has fibroblasts and many fibres (mostly collagen) that are oriented differently.
- Muscle moves the body to adjust to the changes in the environment and to maintain the positions of the various parts of the body. In general, muscles play an active role in all the movements of the body.

Q147 Text Solution:

When a neuron is suitably stimulated, an electrical disturbance is generated that swiftly travels along its plasma membrane.

Q148 Text Solution:

Arrival of the disturbance at the neuron's endings, or output zone, triggers events that may cause stimulation or inhibition of adjacent neurons and other cells.

Q149 Text Solution:

- The dorsal side of a frog is generally olive green with dark spots. On the ventral side, the skin is uniformly pale yellow.
- In frogs, partially digested food called chyme enters the duodenum from the stomach.

Q150 Text Solution:

- Hibernation is a state of dormancy during cold periods when animals significantly slow down their metabolism to conserve energy.
- Metamorphosis is a developmental transformation where an organism undergoes significant changes in its form, like a tadpole turning into a frog.
- Mimicry is a defensive adaptation where an organism resembles another, often harmful, organism to avoid predation.
- Aestivation is the term for a period of reduced metabolic activity in animals during hot weather, where they shelter in cool places to avoid extreme heat.

Q151 Text Solution:

Ventral side of the frog	Uniformly pale yellow
The midbrain of a frog	A pair of optic lobes
Compound epithelium	Inner lining of pancreatic ducts
Squamous epithelium	Air sacs of the lungs

Q152 Text Solution:

Rana tigrina does not have a constant body temperature, i.e., its body temperature varies with the temperature of the environment. Such animals are called cold-blooded or poikilotherms.

Q153 Text Solution:

In frogs, feet have webbed digits that help in swimming.

Q154 Text Solution:

Frogs exhibit sexual dimorphism. Male frogs can be distinguished by the presence of sound-producing vocal sacs and a copulatory pad on the first digit of the forelimbs, which are absent in female frogs.

Q155 Text Solution:

- The hind limbs end in five digits, and they are larger and muscular than the fore limbs that end in four digits.
- Frogs can live both on land and in freshwater and belong to the class Amphibia of phylum

Chordata.

Q156 Text Solution:

- The frog never drinks water but absorbs it through the skin.
- The skin is always maintained in a moist condition.
- Frogs absorb water through their skin, a process called cutaneous absorption.

Q157 Text Solution:

Digestion of food takes place by the action of HCl and gastric juices secreted from the walls of the stomach.

Q158 Text Solution:

The duodenum receives bile from the gall bladder and pancreatic juices from the pancreas through a common bile duct. Bile emulsifies fat, and pancreatic juices digest carbohydrates and proteins.

Q159 Text Solution:

The alimentary canal is short because frogs are carnivores, and hence the length of the intestine is reduced. While villi and microvilli do increase the surface area for nutrient absorption, this happens primarily in the small intestine, not just the stomach. The small intestine is the main site of nutrient absorption in frogs.

Q160 Text Solution:

Frogs respire on land and in the water by two different methods. In water, skin acts as an aquatic respiratory organ (cutaneous respiration). Dissolved oxygen in the water is exchanged through the skin by diffusion. On land, the buccal cavity, skin, and lungs act as the respiratory organs. The respiration by the lungs is called pulmonary respiration.

Q161 Text Solution:

- In frogs, lungs are a pair of elongated, pink coloured sac-like structures present in the upper part of the trunk region (thorax).
- Air enters through the nostrils into the buccal cavity and then into the lungs.
- Frogs have a lymphatic system that consists of lymph, lymph channels, and lymph nodes.

Q162 Text Solution:

The frog's heart is a muscular, three-chambered structure covered by a pericardium. A triangular structure called the sinus venosus joins the right atrium. It receives blood through the major veins called the vena cava. The veins collect blood from different parts of the body to the heart and form the venous system.

Q163 Text Solution:

- In frogs, kidneys are compact, dark red, and bean-like structures situated a little posteriorly in the body cavity on both sides of the vertebral column.
- The medulla oblongata passes out through the foramen magnum and continues into spinal cord.

Q164 Text Solution:

Special venous connections between the liver and the intestine, as well as the kidney and the lower parts of the body, are present in frogs. The former is called the hepatic portal system, and the latter is called the renal portal system.

Q165 Text Solution:

- Unlike mammalian red blood cells, which are enucleated (lack a nucleus), frog red blood cells are nucleated, meaning they still have a nucleus.
- Both frog and mammalian red blood cells contain hemoglobin, the protein responsible for carrying oxygen.

Q166 Text Solution:

Lymph is indeed distinct from blood. It is a fluid that differs in composition, including the lack of red blood cells (RBCs), which are essential for oxygen transport.

Q167 Text Solution:

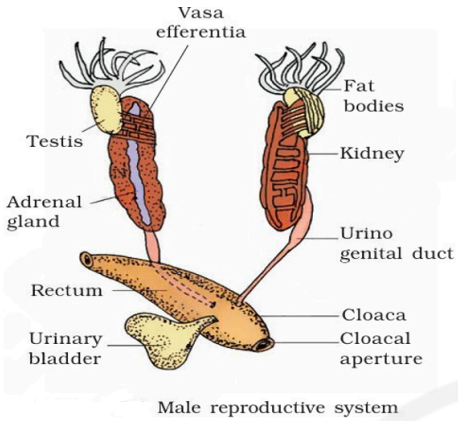
The ventricle of the frog's heart opens into a sac-like conus arteriosus located on the ventral side

of the heart.

Q168 Text Solution:

The frog excretes urea and thus is a ureotelic animal.

Q169 Text Solution:



Male reproductive system

- Each kidney is composed of several structural and functional units called uriniferous tubules or nephrons.
- Two ureters emerge from the kidneys in male frogs. The ureters act as urinogenital duct that opens into the cloaca.

Q170 Text Solution:

The brain is enclosed in a bony structure called the brain box (cranium). The brain is divided into fore-brain, mid-brain and hind-brain. Forebrain includes olfactory lobes, paired cerebral hemispheres and unpaired diencephalon. The midbrain is characterised by a pair of optic lobes. Hind-brain consists of the cerebellum and medulla oblongata. The medulla oblongata passes through the foramen magnum and continues into the spinal cord, which is enclosed in the vertebral column.

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Q172 Text Solution:

Frog has different types of sense organs, namely organs of touch (sensory papillae), taste (taste buds), smell (nasal epithelium), vision (eyes), and hearing (tympanum with internal ears). Out of these, eyes and internal ears are well-organised structures, and the rest are cellular aggregations around nerve endings. Eyes in a frog are a pair of spherical structures situated in the orbit of the skull. These are simple eyes (possessing only one unit). The external ear is absent in frogs, and only the tympanum can be seen externally. The ear is an organ of hearing as well as balancing (equilibrium).

Q173 Text Solution:

The prominent endocrine glands found in frogs are the pituitary, thyroid, parathyroid, thymus, pineal body, pancreatic islets, adrenals, and gonads.

Q174 Text Solution:

The cloaca in male frogs functions as a shared exit chamber for multiple systems is true. Frogs have a cloaca, a common chamber where the urinary, reproductive, and digestive tracts open.

Q175 Text Solution:

Female frogs have separate openings for excretory (ureters) and reproductive (oviducts) ducts, which are distinct from the male anatomy. The ovaries are situated near the kidneys, and there is no functional connection with the kidneys. A pair of oviducts arising from the ovaries opens into the cloaca separately.

Q176 Text Solution:

- A mature female can lay 2500 to 3000 ova at a time.
- Frogs are beneficial for mankind because they eat insects and protect the crop.

Q177 Text Solution:

Autonomic nervous system	Sympathetic and parasympathetic
Organs of touch	Sensory papillae
Simple eyes	A single unit
Cranial nerves	Ten pairs

Q178 Text Solution:

In male frogs, the sperm's path involves the vasa efferentia carrying sperm from the testes to the kidneys, where they enter Bidder's canal and then pass into the urinogenital duct for exit. This system allows the sperm to be transported through the urinary system, which also leads to the cloaca.

Q179 Text Solution:

Frogs do not have a tail or a neck in their adult form. Their body is divided into a head and trunk.

Q180 Text Solution:

Frogs are beneficial to mankind because they eat insects and protect the crop. Frogs maintain ecological balance because they serve as an important link in the food chain and food web in the ecosystem. In some countries, the muscular legs of the frog are used as food by humans.