ANSWER KEY
NEET (FINAL TRACK)
PART TEST-05 (XI)

PHYSICS

Q.1 (4)	Q.2 (2)	Q.3 (3)	Q.4 (4)	Q.5 (4)	Q.6 (3)	Q.7 *(2)*	Q.8 (3)	Q.9 (3)	Q.10 (2)
Q.11 (4)	Q.12 (4)	Q.13 (2)	Q.14 (4)	Q.15 (1)	Q.16 (2)	Q.17 (4)	Q.18 (2)	Q.19 (3)	Q.20 (3)
Q.21 (1)	Q.22 (4)	Q.23 (4)	Q.24 (2)	Q.25 (1)	Q.26 (1)	Q.27 (2)	Q.28 (1)	Q.29 (2)	Q.30 (1)
Q.31 (4)	Q.32 (3)	Q.33 (1)	Q.34 (1)	Q.35 (2)	Q.36 (4)	Q.37 (3)	Q.38 (3)	Q.39 (1)	Q.40 (1)
Q.41 (4)	Q.42 (4)	Q.43 (4)	Q.44 (1)	Q.45 (1)	Q.46 (3)	Q.47 (1)	Q.48 (4)	Q.49 (1)	Q.50 (3)

CHEMISTRY

Q.51 (3)	Q.52 (3)	Q.53 (3)	Q.54 (3)	Q.55 (2)	Q.56 (3)	Q.57 (4)	Q.58 (2)	Q.59 (2)	Q.60 (4)
Q.61 (3)	Q.62 (2)	Q.63 (2)	Q.64 (1)	Q.65 (2)	Q.66 (2)	Q.67 (2)	Q.68 (4)	Q.69 (2)	Q.70 (1)
Q.71 (1)	Q.72 (4)	Q.73 (1)	Q.74 (3)	Q.75 (4)	Q.76 (3)	Q.77 (3)	Q.78 (4)	Q.79 (2)	Q.80 (4)
Q.81 (3)	Q.82 (2)	Q.83 (2)	Q.84 (4)	Q.85 (3)	Q.86 (4)	Q.87 (4)	Q.88 (4)	Q.89 (3)	Q.90 (4)
Q.91 (1)	Q.92 (3)	Q.93 (3)	Q.94 (2)	Q.95 (3)	Q.96 (4)	Q.97 (1)	Q.98 (4)	Q.99 (2)	Q.100 (1)

BIOLOGY

Q.101 (3)	Q.102 (4)	Q.103 (1)	Q.104 (2)	Q.105 (3)	Q.106 (2)	Q.107 (3)	Q.108 (3)	Q.109 (1)	Q.110 (1)
Q.111 (2)	Q.112 (4)	Q.113 (2)	Q.114 (3)	Q.115 (2)	Q.116 (4)	Q.117 (3)	Q.118 (2)	Q.119 (2)	Q.120 (1)
Q.121 (2)	Q.122 (3)	Q.123 (2)	Q.124 (4)	Q.125 (1)	Q.126 (1)	Q.127 (1)	Q.128 (1)	Q.129 (3)	Q.130 (4)
Q.131 (4)	Q.132 (2)	Q.133 (2)	Q.134 (4)	Q.135 (2)	Q.136 (2)	Q.137 (1)	Q.138 (2)	Q.139 (3)	Q.140 (4)
Q.141 (3)	Q.142 (1)	Q.143 (1)	Q.144 (3)	Q.145 (2)	Q.146 (4)	Q.147 (3)	Q.148 (1)	Q.149 (3)	Q.150 (4)
Q.151 (1)	Q.152 (1)	Q.153 (1)	Q.154 (3)	Q.155 (3)	Q.156 (2)	Q.157 (2)	Q.158 (1)	Q.159 (2)	Q.160 (1)
Q.161 (2)	Q.162 (3)	Q.163 (1)	Q.164 (1)	Q.165 (4)	Q.166 (2)	Q.167 (2)	Q.168 (2)	Q.169 (3)	Q.170 (4)
Q.171 (3)	Q.172 (4)	Q.173 (3)	Q174 (1)	Q.175 (4)	Q.176 (4)	Q.177 (2)	Q.178 (1)	Q.179 (3)	Q.180 (3)
Q.181 (3)	Q.182 (1)	Q.183 (4)	Q.184 (1)	Q.185 (3)	Q.186 (2)	Q.187 (3)	Q.188 (4)	Q.189 (4)	Q.190 (4)
Q.191 (2)	Q.192 (2)	Q.193 (1)	Q.194 (3)	Q.195 (1)	Q.196 (4)	Q.197 (4)	Q.198 (3)	Q.199 (3)	Q.200 (4)

SOLUTIONS

PHYSICS
SECTION-A

Q.1 (4)

$x = A/3$

$$K.E = \frac{1}{2}K\left(A^2 - \left(\frac{A}{3}\right)^2 \right)$$

$$= \frac{1}{2}K\left(\frac{8A^2}{9}\right)$$

$$P.E = \frac{1}{2}K\left(\frac{A}{3}\right)^2 = \frac{1}{2}K\left(\frac{A^2}{9}\right)$$

$$\frac{P.E}{K.E} = \frac{\frac{1}{2}K\left(\frac{A^2}{9}\right)}{\frac{1}{2}K\left(\frac{8A^2}{9}\right)} = \frac{1}{8}$$

Q.2 (2)

$a = -4\pi^2 x$

$a = -\omega^2 x$

by comparing

$\omega^2 = 4\pi^2$

$\omega = 2\pi$

$$T = \frac{2\pi}{\omega}$$

$$T = \frac{2\pi}{2\pi} = 1$$

Q.3 (3)

$$T = 2\pi\sqrt{\frac{m}{K}}$$

$$n = \frac{1}{T} = \frac{1}{2\pi}\sqrt{\frac{K}{m}}$$

$$n' = \frac{1}{2\pi}\sqrt{\frac{K}{4m}} = \frac{1}{2}\left[\frac{1}{2n}\sqrt{\frac{K}{m}}\right]$$

$$n' = \frac{n}{2}$$

Q.4 (4)

Frequency of kinetic energy of oscillation is double that of the frequency of SHM.

$f' = 2 \times 80 = 160\ Hz$

Q.5 (4)

$$x = (1) \sin\left(\frac{2\pi}{8} t\right)$$

$$x = \sin\left(\frac{\pi}{4} t\right)$$

$$v = \frac{dx}{dt} = \frac{\pi}{4} \cos \pi/4\, t$$

$$a = \frac{dv}{dt} = -\left(\frac{\pi}{4}\right)^2 \sin \pi/4t$$

at $t = 4/3$

$$a = -\left(\frac{\pi}{4}\right)^2 \sin\left(\frac{\pi}{4} \times \frac{4}{3}\right) = -\frac{\pi^2}{16} \times \frac{\sqrt{3}}{2} = \frac{-\sqrt{3}\pi^2}{32}$$

Q.6 (3)

$$K_{eq} = K + 2K$$
$$= 3K$$

$$T = 2\pi \sqrt{\frac{m}{3K}}$$

$$f = \frac{1}{T} = \frac{1}{2\pi} \sqrt{\frac{3K}{m}}$$

Q.7 (2)

$\omega = 100$

$A = 6cm$

$v_{max} = A\omega$
$$= 6 \times 100 = 600 \, cm/s$$

$$K.E_{max} = \frac{1}{2} mv^2$$

$$= \frac{1}{2} \times 1 \times \left(\frac{600}{100}\right)^2 = \frac{36}{2} = 18 \, J$$

Q.8 (3)

$$g_{eff} = g - \frac{qE}{m}$$

$$T = 2\pi \sqrt{\frac{\ell}{g_{efff}}}$$

$$T = 2\pi \sqrt{\frac{\ell}{g - \dfrac{qE}{m}}}$$

Q.9 (3)

$mg = kx$

Q.9 (continued)
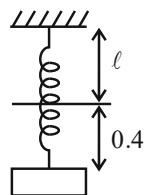
$$k = \frac{mg}{x} = \frac{0.6 \times 10}{0.4}$$

$k = 30/2 \, N/m$
$= 15 \, N/m$

$$T = 2\pi \sqrt{\frac{m}{k}}$$

$$= 2\pi \sqrt{\frac{0.255}{30/2}} = 2\pi \sqrt{\frac{0.255}{15}} = 0.82 \, s$$

Q.10 (2)
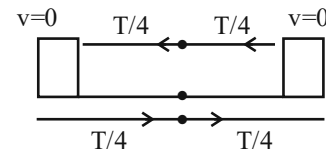
$T/2 = 0.5$

$$\frac{2\pi}{2\omega} = 0.5$$

$$\omega = \frac{\pi}{0.5}$$
$$= 2\pi \, rad/s$$

Q.11 (4)

Kinetic energy $= \dfrac{1}{2} mv^2$

Maximum speed $= v = A\omega$

$$K.E_{max} = \frac{1}{2} m (A\omega)^2$$

$$= \frac{1}{2} m\omega^2 A^2 = \frac{1}{2} \times 2 \times (2)^2 \times (2)^2$$

$$= 16 \, J$$

Q.12 (4)

Initial angular velocity

$$\omega = \sqrt{\frac{K}{m}}$$

so, $v_{max} = A\omega$

When another block is placed on it then

$$\omega' = \sqrt{\frac{K}{2m}} = \frac{\omega}{\sqrt{2}}$$

$$v'_{max} = A'\omega' = A' \frac{\omega}{\sqrt{2}}$$

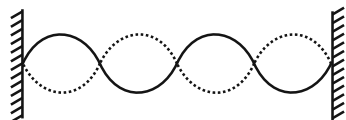$$p_i = p_f$$

$$mA\omega = (2m) A' \frac{\omega}{\sqrt{2}}$$

$$A' = \frac{A}{\sqrt{2}}$$

Q.13 (2)

$2\lambda = L$

$\lambda = \dfrac{L}{2} = \dfrac{4}{2} = 2m$

$v = f\lambda$
$= 180 \times 2$
$= 360 \, m/s$

$f = \dfrac{v}{2\ell} = \dfrac{360}{2 \times 4} = 45 \, Hz$

Q.14 (4)

$\Delta\phi = 60 = \dfrac{\pi}{3}$

$\dfrac{2\pi}{\lambda}\Delta x = \dfrac{\pi}{3}$

$\Delta x = \dfrac{\lambda}{6}$

$V = f\lambda$

$\lambda = \dfrac{v}{f} = \dfrac{300}{600} = \dfrac{1}{2}$

$\Delta x = \dfrac{\lambda}{6} = \dfrac{1/2}{6} = \dfrac{1}{12}m$

$\Delta x = \dfrac{100}{12} \, cm$

$= 8.33 \, cm$

Q.15 (1)

$\mu = \dfrac{m}{\ell} = \dfrac{5 \times 10^{-3}}{0.75} = \dfrac{500}{75} \times 10^{-3}$

$\mu = \dfrac{2}{3} \times 10^{-2} \, kg/m$

$v = \sqrt{\dfrac{T}{\mu}} = \sqrt{\dfrac{60}{2/3 \times 10^{-2}}}$

$= \sqrt{90 \times 10^2} = 30\sqrt{10} \, m/s$

Q.16 (2)

$v = \dfrac{\text{Coefficient of 't'}}{\text{Coefficient of 'x'}}$

$= \dfrac{2}{0.01}$

$= 200 \, cm/s$

Q.17 (4)

$f = \dfrac{1}{2\ell}\sqrt{\dfrac{T}{\mu}} = n$

$\mu = \dfrac{m}{\ell} = \dfrac{\rho\pi r^2 \ell}{\ell}$

$\mu = \rho\pi r^2$

$f = \dfrac{1}{2\ell}\sqrt{\dfrac{T}{\rho\pi r^2}}$

$f \propto \dfrac{\sqrt{T}}{r\ell}$

$\dfrac{f_1}{f_2} = \dfrac{r_2 \ell_2}{r_1 \ell_1} \times \dfrac{\sqrt{T_1}}{\sqrt{T_2}} = \dfrac{n}{n'}$

$n' = n\dfrac{r_1}{r_2}\dfrac{\ell_1}{\ell_2} \times \dfrac{\sqrt{T_2}}{\sqrt{T_1}}$

$n' = n \times \dfrac{r}{3r} \times \dfrac{\ell}{3\ell}\sqrt{\dfrac{3T}{T}} \Rightarrow n' = \dfrac{n}{3\sqrt{3}}$

Q.18 (2)

$K = \dfrac{4\pi}{15} = \dfrac{2\pi}{\lambda}$

$\dfrac{1}{\lambda} = \dfrac{2}{15}$

wave in 60cm $= \dfrac{2}{15} \times 60 = 8$

No. of loops $= 8 \times 2 = 16$

Q.19 (3)

$v_\omega = \dfrac{A\omega}{2}$

$\dfrac{\omega}{k} = \dfrac{A\omega}{2} \quad \left(K = \dfrac{2\pi}{\lambda}\right)$

$\dfrac{\lambda}{2\pi} = \dfrac{A}{2}$

$\lambda = \pi A$

Q.20 (3)

$K = \dfrac{\pi}{3}$

$\dfrac{2\pi}{\lambda} = \dfrac{\pi}{3}$

$\lambda = 6$

Seperation between two adjacent nodes $= \dfrac{\lambda}{2}$

$= \dfrac{6}{2} = 3 \, cm$

Q.21 (1)

Sign of coefficient of x and t is same so, the wave is travelling in –ve x-direction.

$$V = \frac{\text{Cooefficient of t}}{\text{Coefficient of x}}$$

$$= \frac{15\pi}{10\pi}$$

$$= 1.5 \text{ m/s}$$

Q.22 (4)

8 loops : $4\lambda_1 = L$ $\lambda_1 = L/4$

4 loops : $2\lambda_2 = L$ $\lambda_2 = L/2$

$$\frac{\lambda_1}{\lambda_2} = \frac{1}{2} \quad \left(V = f\lambda = \sqrt{\frac{T}{\mu}} \right)$$

$$\lambda \propto \sqrt{T}$$

$$\frac{\lambda_1}{\lambda_2} = \sqrt{\frac{T_1}{T_2}} \Rightarrow T_2 = \left(\frac{\lambda_2}{\lambda_1} \right)^2 \times T_1$$

$$= (2)^2 \times 49 = 196 \text{ N}$$

Q.23 (4)

$$v = \frac{3}{1} = 3 \text{ m/s}$$

Coefficient of x & t are of same sign.

∴ wave is trevelling in –ve x-direction.

Q.24 (2)

$$f = \frac{V}{4\ell}, \frac{3V}{4\ell}, \frac{5V}{4\ell}$$
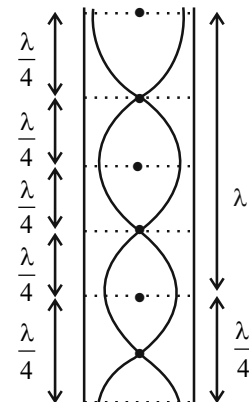
$$\Rightarrow \lambda = \frac{4\ell}{5}$$

$$\ell = \frac{5\lambda}{4}$$

Nodes = 3

Antinodes = 4

Q.25 (1)

In 2 seconds beats = 4

In 1 second beats = $\frac{4}{2}$ = 2 beat/sec

$\Delta f = 2$

$$\Delta t = \frac{1}{\Delta f}$$

$$= \frac{1}{2} \text{ sec}$$

Q.26 (1)

$$\frac{v}{4\ell} = 100 \text{ Hz}$$

first overtone = $\frac{3v}{4\ell}$

$$= 3 \times 100 = 300 \text{ Hz}$$

Q.27 (2)

$$v = \sqrt{\frac{\rho RT}{M}}$$

In summer temperature is high so speed will be more.

Q.28 (1)

$v = 2f(\ell_2 - \ell_1)$
$= 2 \times 300 (55 - 17) \times 10^{-2}$
$= 6 \times 38 = 228 \text{ m/s}$

Q.29 (2)

$$P_1 \rightarrow f_1 = \frac{3v}{4\ell_1}$$

$$P_2 \rightarrow f_2 = \frac{3v}{2\ell_1}$$

$$f_1 = f_2$$

$$\frac{3v}{4\ell_1} = \frac{3v}{2\ell_1}$$

$$\frac{\ell_1}{\ell_2} = \frac{1}{2}$$

Q.30 (1)

$$\frac{v}{4L} = 264$$

$$\frac{330}{4 \times 264} = L$$

$L = 31.25 \text{cm}$
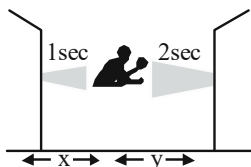
Q.31 (4)

Beats formation is caused by interferece.

Q.32 (3)

Using the phenomenon of echo velocity of sound and depth of ocean can be determined.

Q.33 (1)

$$1 = \frac{2x}{V} \qquad\qquad 2 = \frac{2x}{V}$$

$$1+2 = \frac{2x+2y}{V} \Rightarrow x+y = \frac{3V}{2}$$

Q.34 (1)

Speed of sound in dry air is 340 m/s, while it is 346 m/s in moist air $\rho_{dry\ air} > \rho_{moist\ air}$

Q.35 (2)

$$I = \frac{P}{A}$$

$$I = \frac{400\pi}{4\pi(20)^2}$$

$$I = 1/4 \text{ w/m}^2$$

Loudness $= 10 \log \dfrac{I}{I_0}$

$$= 10 \log_{10} \frac{1/4}{10^{-12}}$$

$$= 10 \log_{10} \frac{10^{12}}{4}$$

$$= 120 \text{ dB} - 10 \log_{10} 4 \text{dB}$$
$$= 120 \text{ dB} - 20 \log_{10} 2 \text{dB}$$
$$= (120 - 20 \times 0.3) \text{ dB}$$
$$= (120 - 6) \text{ dB} = 114 \text{ dB}$$

SECTION-B

Q.36 (4)

$$v = \omega\sqrt{A^2 - x^2}$$
$$\Rightarrow v^2 = A^2\omega^2 - \omega^2 x^2 \qquad ....(1)$$
$$8v^2 = 10 - 2x^2$$

$$v^2 = \frac{10}{8} - \frac{1}{4}x^2 \qquad ....(2)$$

Comparing both equations

$$\omega^2 = \frac{1}{4}$$

$$\omega = \frac{1}{2} \qquad \Rightarrow T = \frac{2\pi}{\omega}$$

$$T = \frac{2\pi}{1/2} = 4\pi$$

Q.37 (3)

$$y = 8\sin 5\pi t + 8\sqrt{3}\ \cos 5\pi t$$
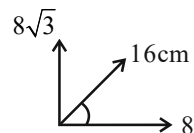
$$A_{net} = \sqrt{8^2 + \left(8\sqrt{3}\right)^2}$$
$$= 8 \times 2 = 16 \text{ cm}$$

$$\omega = 5\pi$$

$$T = \frac{2\pi}{\omega} = \frac{2\pi}{5\pi} = 0.4$$

Q.38 (3)

$$K.E = \frac{1}{2}K\left(A^2 - x^2\right)$$

$$P.E = 1/2\ Kx^2$$

Total energy $= \dfrac{1}{2}K\left(A^2 - x^2\right) + \dfrac{1}{2}Kx^2$

$$= \frac{1}{2}KA^2$$

$$= \text{constant}$$

Q.39 (1)
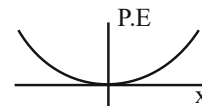
$$a = \omega^2 x$$

$$\omega = \sqrt{\frac{a}{x}}$$

$$= \sqrt{\frac{2}{2 \times 10^{-2}}}$$

$$= 10 \text{ rad/s}$$

Q.40 (1)

Potential energy(P.E) $= \dfrac{1}{2}Kx^2$

Q.41 (4)

At mean position
P.E = 3J
K.E = (4J) × 2 = 8J
Total energy = 3 + 8
= 11 J

Q.42 (4)

$v = \omega \sqrt{A^2 - x^2}$

so, as the distance from mean position increases, velocity decrease and it is maximum at mean position.
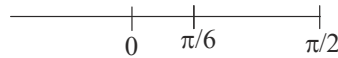
$v_{max} = A\omega$

$a = -\omega^2 x$

$|a| = \omega^2 x$

at mean position $x = 0$

$\therefore a = 0$

Q.43 (4)

Time taken to reach from mean to half of amplitude

$$\begin{array}{ccc} & | & | & | \\ 0 & \pi/6 & \pi/2 \end{array}$$

$t = \dfrac{\theta}{W} = \dfrac{\pi}{6 \times 2\pi} T = \dfrac{T}{12}$

$t = \dfrac{4}{12} = \dfrac{1}{3} \sec.$

Q.44 (1)

$I_{axis} = I_{com} + mx^2$

$= \dfrac{mR^2}{2} + m\left(\dfrac{R}{2}\right)^2$

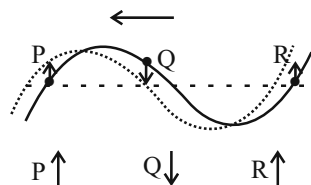$= \dfrac{mR^2}{2} + \dfrac{mR^2}{4} = \dfrac{3mR^2}{4}$

$T = 2\pi \sqrt{\dfrac{I_{axis}}{mg\,x}}$

$= 2\pi \sqrt{\dfrac{3mR^2 \times 2}{4mg \times R}}$

$= 2\pi \sqrt{\dfrac{3R}{2g}}$

Q.45 (1)

P↑   Q↓   R↑

Left to right traveling of wave

P↓   Q↑   R↓
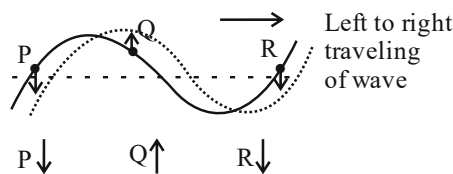
Q.46 (3)

In 60 sec. waves = 54

In 1 sec wave = $\dfrac{54}{60} = \dfrac{9}{10}$

$f = 0.9$ Hz

$v = f\lambda$

$= 0.9 \times 10 \quad = 9$ m/s

Q.47 (1)

$\dfrac{V}{2L} = 500$

$V = (500) \times 2L$

$= 1000\,L \quad = 1000 \times 0.2 = 200$ m/s

Q.48 (4)

$f = \dfrac{v}{\lambda}$

$v \propto \sqrt{T}$

$\dfrac{v_1}{\lambda_1} = \dfrac{v_2}{\lambda_2}$

$\dfrac{\sqrt{T_1}}{\lambda_1} = \dfrac{\sqrt{T_2}}{\lambda_2}$

$\dfrac{\sqrt{300}}{100} = \dfrac{\sqrt{400}}{\lambda_2}$

$\lambda_2 = \dfrac{20 \times 100}{10\sqrt{3}}$

$= \dfrac{200}{\sqrt{3}} = 115$ cm

Q.49 (1)

$f = \dfrac{V}{2L}$

Frequency is independent of radius

$f \propto \dfrac{1}{L}$

$\dfrac{f}{f'} = \dfrac{2L}{L}$

$f' = \dfrac{f}{2}$

Q.50 (3)

Speed of sound is higher for more elastic median.

As solid are more elastic than gas.

$V = \sqrt{\dfrac{\text{Elasticity coefficient}}{\rho}}$

CHEMISTRY
SECTION-A

Q.51 (3)
Pb in +4 State behave as oxidising agent.
Pb^{+2} Stable
Sn^{+2} reducing agent
Tl^{+3} Oxidising agent
Bi^{+3}, Sn^{+4} Stable

Q.52 (3)
Melting point order of group 13 elements
$B > Al > Tl > In > Ga$

Q.53 (3)
Fullerene is purest allotrope of carbon.

Q.54 (3)
$AlCl_3 > AlCl$
$TlCl > TlCl_3$
$SnCl_4 > SnCl_2$
$BiCl_3 > BiCl_5$

Q.55 (2)
$SiCl_4 \xrightarrow{H_3O^{\oplus}} Si(OH)_4$
Silicic acid

Q.56 (3)
Melting point order $\rightarrow$
$C > Si > Ge > Sn > Pb$

Q.57 (4)
Group - 13 elements show +1 and +3 oxidation state.

Q.58 (2)
Boron trioxide reacts with metallic oxides forming metal borates.

Q.59 (2)
Ga has more ionisation enthalpy than Al.

Q.60 (4)
Facts

Q.61 (3)
General electronic configuration of p-block element is $ns^2\,np^{1-6}$.

Q.62 (2)
Inert pair effect commonly observed in p-block.

Q.63 (2)
Atomic no. $Z = 104$
[Rutherfordium]

Q.64 (1)
On moving down the group electronegativity decreases.

Q.65 (2)
$Z = 106 = $ UnnilHexium (Unh).

Q.66 (2)
Fe $\rightarrow$ Transition element
Cl $\rightarrow$ Non-metal
Ge $\rightarrow$ Metalloid
U $\rightarrow$ Actinoid

Q.67 (2)
$(n-1)s^2\,p^6\,ns^1$
Belongs to Alkali metals.

Q.68 (4)
Nitrogen has positive e^- gain enthalpy due to stable half filled (p^3) configuration. Noble gases have stable full filled configuration so it has positive e^- gain enthalpy.

Q.69 (2)
Lanthanides $\rightarrow$ atomic no. 58 to 71

Q.70 (1)
$B_2O_3 \rightarrow$ Acidic
NO $\rightarrow$ Neutral
CrO $\rightarrow$ Basic
$ZnO, Al_2O_3, PbO, PbO_2, SnO, SnO_2, Cr_2O_3 \rightarrow$ Amphoteric oxide

Q.71 (1)
$[Rn]\,5f^{14}\,6d^2\,7s^2$
Belongs to 7th period and 4th group and element name is Rutherfordium ($Z = 104$).

Q.72 (4)
Atomic radii order
$B < Ga < Al < In < Tl$

Q.73 (1)
Alkaline earth metals generally shows biggest jump between 2nd and 3rd I.E.

Q.74 (3)
Ionic radii $\rightarrow$
$F^- < O^{-2} < S^{-2} < Br^-$

Q.75 (4)
Atomic no. 104 → belongs
to d-block elements.

Q.76 (3)
Atomic size →
C > N > O > F

Q.77 (3)
EA
Cl = –349 kJ/mol
I = –295
S = –200

Q.78 (4)
Facts

Q.79 (2)
[Ne] $3s^2 3p^3$ have highest I.E. due to
stable half filled (p^3) configuration.

Q.80 (4)
Z = 112 belongs to period number 7.

Q.81 (3)
Bond strength →
HF > HCl > HBr > HI

Q.82 (2)
He (noble gas) has higher I.P and Cs
(Alkali metal) has lowest I.P in
periodic table.

Q.83 (2)
M Show +2 oxidation state so
formula is MCl_2.

Q.84 (4)
Z = 59 placed in f-block in
Lanthanide series.

Q.85 (3)
Non-metalic character →
F > N > C > B > Si

SECTION-B

Q.86 (4)
Melting points and boiling points of
group-14 elements are much higher
than those of corresponding elements of group-13
elements.

Q.87 (4)
Anhy. $AlCl_3$ is partially hydrolysed
with atmospheric moisture to liberate
HCl gas. Moist HCl appears white in colour.

Q.88 (4)
Facts

Q.89 (3)
Boron does not form MF_6^{3-} ion
because it can not expand its valency
more than 4.

Q.90 (4)
Facts

Q.91 (1)
Negative e^- gain enthalpy order of
group-16 elements-
S > Se > Te > Po > O

Q.92 (3)
Be shows diagonal relationship with
aluminium (Al).

Q.93 (3)
Na_2O → Basic
SO_3 → Acidic
AS_2O_3 → Amphoteric
N_2O → Neutral

Q.94 (2)
Atomic radii
$Na^- > Na > Na^+$

Q.95 (3)
Electronegativity order →
O > N > C > Si

Q.96 (4)
Conceptual

Q.97 (1)
Atomic radius
Ne   >   F
(1.34) Å   (0.90) Å,

Q.98 (4)
Facts

Q.99 (2)
Electron gain enthalpy and
ionisation enthalpy contains
units of energy but electronegativity and metallic
character are unit less.

Q.100 (1)
3 → Li
33 → As
53 → I
87 → Fr

BIOLOGY-I
SECTION-A

Q.101 (3)
New NCERT Pg. No. 190

Receptors associated with aortic arch and carotid artery also can recognize changes in CO_2 and H^+ concentration and send necessary signals to the rhythm centre for remedial actions.

Q.102 (4)
New NCERT Pg. No. 190

Enzyme catalysing above reaction is carbonic anhydrase. It belongs to class IV of enzyme i.e. lyases.
The reaction progresses in forward/right direction when the levels of carbon dioxide is high.
The reaction progresses in reverse direction in alveoli for CO_2 to be exhaled out.

Q.103 (1)
New NCERT Pg. No. 185-186

The contraction of external inter-costal muscles lifts up the ribs and the sternum causing an increase in the volume of the thoracic chamber in the dorso-ventral axis.

Q.104 (2)
New NCERT Pg. No. 189

In the tissues, where low pO_2, high pCO_2, high H^+ concentration and higher temperature exist, the conditions are favourable for dissociation of oxygen from the oxyhaemoglobin.

Q.105 (3)
New NCERT Pg. No. 185

The part starting with the external nostrils up to the terminal bronchioles constitute the conducting part whereas the alveoli and their ducts form the respiratory or exchange part of the respiratory system.

Q.106 (2)
New NCERT Pg. No. 194

Thrombocytes – 1.5-3,5lac/mm³ of blood
Erythrocytes – 5-5.5 million/mm³ of blood
Leucocytes – 6000 - 8000/mm³ of blood
Haemoglobin – 12-16 g/100 ml of blood

Q.107 (3)
New NCERT Pg. No. 203

Cardia arrest is complete stoppage of working of heart.

Q.108 (3)
New NCERT Pg. No. 201

To obtain a standard ECG, a patient is connected to the machine with three electrical leads (one to each wrist and to the left ankle) that continuosly monitor the heart activity.

Q.109 (1)
New NCERT Pg. No. 199

In humans, maximum number of action potentials are generated by sino-atrial node which is present in the right upper corner of the right atrium of heart.

Q.110 (1)
New NCERT Pg. No. 197

Closed circulatory system is considered as more advantageous than open circulatory system as the flow of fluid can be more precisely regulated.

Q.111 (2)
New NCERT Pg. No. 201

Pulmonary circuit

Right ventricle $\xrightarrow{\text{Pulmonary artery}}$ lungs $\xrightarrow{\text{Pulmonary vein}}$ left atrium

Systemic circuit

Left ventricle $\xrightarrow{\text{Aorta}}$ body tissues $\xrightarrow{\text{Vena cava}}$ right atrium

Q.112 (4)
New NCERT Pg. No. 213

Presence of glucose and ketone bodies in urine are indicative of diabetes mellitus.
Diabetes insipidus occurs due to hyposecretion of ADH.

Q.113 (2)
New NCERT Pg. No. 205

Frags are uricotelic. Birds and reptiles are uricotelic.

Q.114 (3)
New NCERT Pg. No. 209

Urea is reabsorbed passively in renal tubules of nephrons.

Q.115 (2)
New NCERT Pg. No. 209

The descending limb of loop of Henle is permeable to water but almost impermeable to electrolytes.
The ascending limb is impermeable to water but allows transport of electrolytes actively or passively.

Q.116 (4)
New NCERT Pg. No. 206

Kidneys are located between the levels of last thoracic and third lumbar vertebra.

Q.117   (3)
New NCERT Pg. No. 209
JGA is a special sensitive region formed by cellular modifications in the distal convulated tubule and the afferent arteriole at the location of their contact.

Q.118   (2)
New NCERT Pg. No. 222
Muscle contraction is initiated by a signal sent by the central nervous system via a motor neuron.

Q.119   (2)
New NCERT Pg. No. 221
The globular head of the meromyosin has active sites for actin and binding sites for ATP.

Q.120   (1)
New NCERT Pg. No. 227
Saddle joint is present between carpal and metacarpal of human thumb.

Q.121   (2)
New NCERT Pg. No. 224
Bones have a very hard matrix due to calcium salts in it and cartilage has slightly pliable matrix due to chondroitin salts.

Q.122   (3)
New NCERT Pg. No. 226
Acromian process is a part of scapula and is found in pectoral girdle.
Glenoid cavity is a depression to which head of humerus articulates.
Sternum is a flat bone on the ventral midline of the thorax.

Q.123   (2)
New NCERT Pg. No. 224
Axial skeleton consists of so bones while appendicular skeleton consists of 126 bones.

Q.124   (4)
New NCERT Pg. No. 232
Dendrites transmit impulses towards the cell body. Axon carries impulses away from cell body.

Q.125   (1)
New NCERT Pg. No. 236
The inner parts of cerebral hemispheres and a group of associated deep structures like amygdala, hippocampus, etc., form a complex structure called the limbic lobe or limbic system. Hypothalamus contains a number of centres which control body temperature, urge for eating and drinking.

The cerebrum wraps around a structure called thalamus, which is a major coordinating centre for sensory and motor signaling. The dorsal portion of the midbrain consists mainly of four round swellings (lobes) called **corpora quadrigemina.**

Q.126   (1)
New NCERT Pg. No. 236
The cerebral cortex is called gray matter because of its grayish appearance due to concentration of neuronal cell bodies.

Q.127   (1)
New NCERT Pg. No. 234
Neurotransmitters binds to receptors present on post-synaptic neuron.

Q.128   (1)
New NCERT Pg. No. 232
When a stimulus is applied at a site on polarised axonal membrane, the membrane at site becomes freely permeable to Na^+ because of opening of Na^+ gated channels and influx of Na^+ from extracellular fluid into axoplasm takes place.

Q.129   (3)
New NCERT Pg. No. 248
mRNA does not act as second messenger.

Q.130   (4)
New NCERT Pg. No. 242
Pineal gland has no role in secretion of pepsinogen which is a digestive enzyme.

Q.131   (4)
New NCERT Pg. No. 240, 243, 245
Insulin – Glucagon
Calcitonin – Parathormone
Aldosterone – Atrial natriuretic factor
GnRH – Somatostatin

Q.132   (2)
New NCERT Pg. No. 243
PTH is a peptide hormone. Which increases blood calcium level.

Q.133   (2)
New NCERT Pg. No. 239
The endocrine system provides chemical integration through hormones.
Point-to-point connection is provided by neural system.

Q.134   (4)
New NCERT Pg. No. 247
GnRH is a hypothalamic hormone.

Q.135 (2)
New NCERT Pg. No. 243

Grave's disease or exopthalmic goitre is a form of hyperthyroidism.

SECTION-B

Q.136 (2)
New NCERT Pg. No. 183

Special vascularised structures called gills are used by most of the aquatic arthropods and molluscs. Respiration through gills is called branchial respiration.

Q.137 (1)
New NCERT Pg. No. 189

Haemoglobin is the red-coloured pigment that carries maximum four, 4 molecules of O_2. 1 haemoglobin combines with 4 molecules of O_2.

Q.138 (2)
New NCERT Pg. No. 196

During clotting of blood, Inactive fibrinogens are converted into fibrin in the plasma by the enzyme thrombin.

Q.139 (3)
New NCERT Pg. No. 199, 200

All the four chambers of heart remain in a relaxed state during complete cardiac diastole or joint diastole.

Q.140 (4)
New NCERT Pg. No. 206, 207

Inside the kidney, there are two zones, an outer cortex and an inner medulla. The medulla is divided into a few conical masses (medullary pyramids) projecting into the calyces.

Q.141 (3)
New NCERT Pg. No. 207

Glomerulus alongwith Bowman's capsule is called the renal corpuscle or malphigian body.

Q.142 (1)
New NCERT Pg. No. 211

In ascending limb, reabsorption of electrolytes takes place.
counter current mechanism produces osmolarity gradient 300 mOsmol/ℓ to 1200 mOsmol/ℓ from outercortex to inner medulla.
Reabsorption of water takes place in collecting duct.

Q.143 (1)
New NCERT Pg. No. 226

Each half of pectoral girdle consists of 1 clavicle and 1 scapula.

Q.144 (3)
New NCERT Pg. No. 227

Tetany – Rapid spasm in muscle
Osteopororis – Bone mass is decreased
Muscular dystrophy – Progressive degeneration of skeletal muscle
Arthritis – Inflammation of joints
Myasthenia gravis – Autoimmune disorder

Q.145 (2)
New NCERT Pg. No. 222

During shortening of muscle, A-band retains length, whereas, I-band gets reduced.
Isotropic band of a myofibril consists of actin filament.

Q.146 (4)
New NCERT Pg. No. 231

The somatic neural system relays impulses from the CNS to skeletal muscles.

Q.147 (3)
New NCERT Pg. No. 232

Myelinated nerve fibres are enveloped by schwann cells.
Schwann cells produce myelin sheath around axon.

Q.148 (1)
New NCERT Pg. No. 236

Inner parts of cerebral hemisphere is myelinated and is called white matter.
The cerebrum wraps around a structure called thalamus.

Q.149 (3)
New NCERT Pg. No. 248

Adrenaline and glucagon bind with membrane bound receptors.

Q.150 (4)
New NCERT Pg. No. 245

Glucocorticoids produce anti-inflammatory reactions and suppresses the immune response.
Metabolism, pigmentation and menstrual cycle are regulated by melatonin.
Growth of mammary glands and formation of milk is function of prolactin.

BIOLOGY-II
SECTION-A

Q.151 (1)
New NCERT Pg. No. 190

Another centre present in the pons region of the brain called pneumotaxic centre can moderate the functions of the respiratory rhythm centre.

Q.152 (1)
New NCERT Pg. No. 187, 188

Primary site for exchange of gases in humans is alveoli which is lined by simple squamous epithelial cells.

Q.153 (1)
New NCERT Pg. No. 190

Role of oxygen is quite insignificant in regulating respiratory rhythm centre. Receptors that modify the working of RRC gets activated by rise in pCO_2 and H^+ concentration. Every 100 ml of deoxygenated blood delivers 4 ml of CO_2 to alveoli.

Q.154 (3)
New NCERT Pg. No. 187

The maximum volume of air a person can breathe in after a forced expiration. This includes ERV, TV and IRV or the maximum volume of air a person can breathe out after a forced inspiration.

Q.155 (3)
New NCERT Pg. No. 190

Emphysema is a chronic disorder in which alveolar walls are damaged due to which respiratory surface is decreased. One of the major causes of this is cigarette smoking.

Q.156 (2)
New NCERT Pg. No. 198

Heart is protected by a double walled membranous bag, pericardium, enclosing the pericardial fluid.

Q.157 (2)
New NCERT Pg. No. 197

Lymph is a colourless fluid containing specialised lymphocytes. It lacks haemoglobin and RBCs.

Q.158 (1)
New NCERT Pg. No. 198

The opening between the right atrium and the right ventricle is guarded by a valve formed of three muscular flaps or cusps, the tricuspid valve.

Q.159 (2)
New NCERT Pg. No. 198-199

Semilunar valves prevent backward flow of blood into ventricles from arteries.

Q.160 (1)
New NCERT Pg. No. 195

Donor's plasma = anti-B only antibodies
∴ Blood group of donor = A
Surface antigen present on RBC in donor = A
∴ A person with blood group A can give blood group only to a person having blood group A and AB.
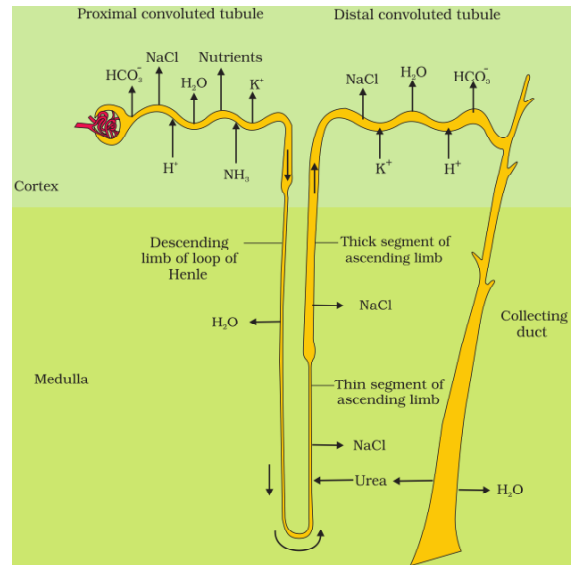
Q.161 (2)
New NCERT Pg. No. 197

Amphibians have three chambered heart; with two atria and one ventricle.

Q.162 (3)
New NCERT Pg. No. 210

H^+ and NH_3 are generally secreted in PCT of nephron.

Q.163 (1)
New NCERT Pg. No. 208

A minute vessel of peritubular capillaries network runs parallel to the Henle's loop forming a 'U' shaped vasa recta.

Q.164 (1)
New NCERT Pg. No. 213

Analysis of urine helps in clinical diagnosis of many metabolic disorders as well as malfunctioning of kidneys. Urine formed by nephrons is carried to urinary bladder by ureters.

Q.165 (4)
New NCERT Pg. No. 206

Flame cells → Rotifers
Nephridia → Earthworms
Malpighian tubules → Insects
Antennal glands → Prawns

Q.166 (2)
New NCERT Pg. No. 213

Glomerulonephritis is due to the inflammation of glomeruli of kidney.

Q.167 (2)
New NCERT Pg. No. 212

ANF causes vasodilation and decreases blood pressure.
ADH is a potent vasoconstrictor.

Q.168 (2)
New NCERT Pg. No. 227

Cartilaginous joints allow limited movement. Adjacent vertebrae in the vertebral column are cartilaginous joints. Flat skull bones have immovable fibrous joints. Joints between atlas – axis and between carpals – metacarpals are of freely movable synovial type.

Q.169 (3)
New NCERT Pg. No. 218

About 40-50% of the body weight of a human adult is contributed by muscles.

Q.170 (4)
New NCERT Pg. No. 219

Each organised skeletal muscle is made of a number of muscle bundles or fascicles held together by fascia. Muscle fibre contains a large number of parallely arranged myofibrils. Myofibrils contains sarcomere. Each sarcomere contains 1 A-band and 2 half I-bands.

Q.171 (3)
New NCERT Pg. No. 219

Cardiac muscles are faintly striated and are involuntary in action.

Q.172 (4)
New NCERT Pg. No. 221

During resting state of skeletal muscle fibre, a subunit of troponin masks the active binding sites on actin.

Q.173 (3)
New NCERT Pg. No. 222

Cross bridge is broken due to attachment of ATP to ATP binding site present on myonin head.

Q174 (1)
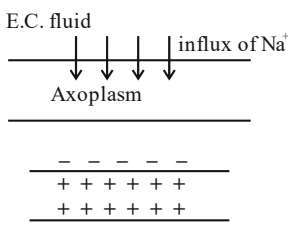**New NCERT Pg. No. 236**

Cerebral hemispheres → Cerebrum divided into two halves
Corpus callosum → Connect two hemispheres
Association areas → Intersensory association
Hypothalamus → Urge for eating and drinking

Q.175 (4)
New NCERT Pg. No. 232

When a stimulus is applied at a site on polarised axonal membrane, the membrane at site becomes freely permeable to Na^+ because of opening of Na^+ gated channels and influx of Na^+ from extracellular fluid into axoplasm takes place.

E.C. fluid
influx of Na^+
Axoplasm

$\begin{array}{c} - - - - - \\ + + + + + \\ + + + + + \\ - - - - - \end{array}$

Q.176 (4)
New NCERT Pg. No. 231

CNS $\xrightarrow{\text{Autonomous neural system}}$ Involuntary organs

CNS $\xrightarrow{\text{somatic neural system}}$ Skeletal muscles
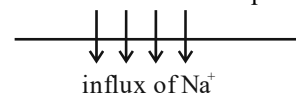
Q.177 (2)
New NCERT Pg. No. 234

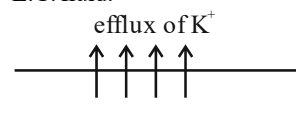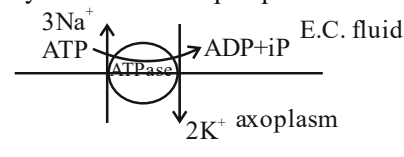In a synapse, synaptic cleft may be present or it may be absent.

Q.178 (1)
New NCERT Pg. No. 233

Depolarisation is due to influx of Na^+ from E.C. fluid into axoplasm.

influx of Na^+

Repolarisation is due to efflux of K^+ from axoplasm into E.C. fluid.

efflux of K^+

During resting state, the ionic gradient is maintained by Na^+/K^+ ATPase pump.

$3Na^+$
ATP → ADP+iP   E.C. fluid
ATPase
$2K^+$ axoplasm

Q.179 (3)
New NCERT Pg. No. 232

D is node of Ranvier.

Dendrites
Nissl's granules
Cell body
Nucleus
Schwan cell
Axon
Myelin sheath
Node of Ranvier
Axon terminal
Synaptic knob
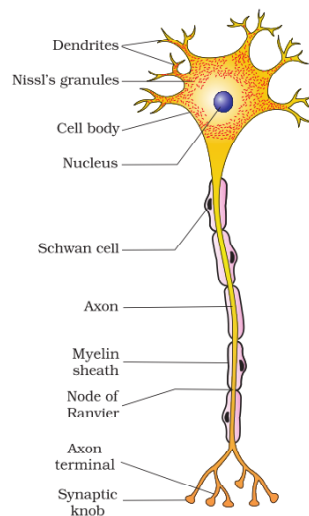
Q.180 (3)
New NCERT Pg. No. 245

Aldosterone – Adrenal cortex, Mineralocorticoid
Cortisol – Glucocorticoid
Glucagon – α-cells of Pancreas

Q.181 (3)
New NCERT Pg. No. 245
Insulin is a peptide hormone released by pancreas, a composite gland and it increases cellular glucose uptake.

Q.182 (1)
New NCERT Pg. No. 243
Thymosins released from thymus plays a major role in the differentiation of T-lymphocytes, which provide cell-mediated immunity.

Q.183 (4)
New NCERT Pg. No. 243
Protrusion of eyeballs result from hyperthyroidism in exopthalmic goitre.

Q.184 (1)
New NCERT Pg. No. 247
Heart releases ANF. Kidney releases erythropoietin GIT releases gastrin, secretin, cholecystokinin and gastric inhibitory peptide.

Q.185 (3)
New NCERT Pg. No. 244
Alertness, pupilary dilation and piloerection are due to catecholamines released from adrenal medulla during emergency conditions.

SECTION-B

Q.186 (2)
New NCERT Pg. No. 190
A chemosensitive area is situated adjacent to the rhythm centre which is highly sensitive to CO_2 and hydrogen ions. Increase in these substances can activate this centre.

Q.187 (3)
New NCERT Pg. No. 184
During swallowing, glottis is covered by a thin elastic cartil aginous flap called epiglottis to prevent the entry of food into the larynx.

Q.188 (4)
New NCERT Pg. No. 199
Conducting pathway of heart :
SA Node $\rightarrow$ AV node $\rightarrow$ Bundle of His $\rightarrow$ Purkinje fibres.

Q.189 (4)
New NCERT Pg. No. 195
Mega karyoagtes are special cells in bone narrow whose fragments produces throm bocytes.

Q.190 (4)
New NCERT Pg. No. 209
Descending linb of $\rightarrow$ Impermeable to electrolytes loop of Henle
Distal convoluted Tubule $\rightarrow$ Conditional reabsorption of $Na+$, H_2O
Ascending limb of $\rightarrow$ Impermeable to water loop of Henle
Proximal convielated Tubule $\rightarrow$ Reabsorption of Na^+ & nutrients

Q.191 (2)
New NCERT Pg. No. 209
The amount of filtrate formed by the kidneys per minute is called GFR. It is approximately 125me/minute.

Q.192 (2)
New NCERT Pg. No. 212
Dicresis is excessive urination.
It can be prevented by readsorption of Na^+ and water from renal tubules due to aldosterone.

Q.193 (1)
New NCERT Pg. No. 227
Saddle joint is present between carpal and metacarpal of human thumb.

Q.194 (3)
New NCERT Pg. No. 220
Actin filaments are thinner and is known as thin filament.
Myosin filaments are thicker and is known as thick filament, In the centre of each 'I' band, Z line is present.

Q.195 (1)
New NCERT Pg. No. 227
Ball and socket joint is present between ofenoid cavity and head of humerus.

Q.196 (4)
New NCERT Pg. No. 224
X is Parietal Bone
Y is frontal bone
Joint present between cranial bones are fibrous joints.

Q.197 (4)
New NCERT Pg. No. 236
Association areas are resposible for complex functions like intersensory associations, memory and communication.

Q.198 (3)
New NCERT Pg. No. 236
Cerebral aqueduct is present in mid-brain.
Mid-brain is located between thalamus (forebrain) and pons (hindbrain)

Q.199 (3)
New NCERT Pg. No. 232

The sodium-potassium pump which transports 3 Na^+ outwards for 2 K^+ into the cell.

Q.200 (4)
New NCERT Pg. No. 244

The adrenal medulla secretes two hormones called **adrenaline** or **epinephrine** and **noradrenaline** or **norepinephrine**. These are commonly called as **catecholamines**.