ANSWER KEY
NEET
Part Test-03 (XI Regular)

PHYSICS

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

CHEMISTRY

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

BIOLOGY-I

Q.101 (3)	**Q.102** (1)	**Q.103** (4)	**Q.104** (4)	**Q.105** (2)	**Q.106** (1)	**Q.107** (2)	**Q.108** (3)	**Q.109** (2)	**Q.110** (2)
Q.111 (3)	**Q.112** (1)	**Q.113** (4)	**Q.114** (1)	**Q.115** (1)	**Q.116** (1)	**Q.117** (2)	**Q.118** (3)	**Q.119** (2)	**Q.120** (3)
Q.121 (1)	**Q.122** (4)	**Q.123** (2)	**Q.124** (1)	**Q.125** (2)	**Q.126** (1)	**Q.127** (4)	**Q.128** (3)	**Q.129** (4)	**Q.130** (2)
Q.131 (3)	**Q.132** (1)	**Q.133** (1)	**Q.134** (2)	**Q.135** (1)	**Q.136** (1)	**Q.137** (2)	**Q.138** (1)	**Q.139** (3)	**Q.140** (1)
Q.141 (2)	**Q.142** (1)	**Q.143** (4)	**Q.144** (2)	**Q.145** (1)	**Q.146** (4)	**Q.147** (4)	**Q.148** (2)	**Q.149** (1)	**Q.150** (3)

BIOLOGY-II

Q.151 (3)	**Q.152** (1)	**Q.153** (4)	**Q.154** (1)	**Q.155** (3)	**Q.156** (1)	**Q.157** (3)	**Q.158** (3)	**Q.159**(3)	**Q.160** (1)
Q.161 (1)	**Q.162** (4)	**Q.163** (1)	**Q.164** (2)	**Q.165** (3)	**Q.166** (1)	**Q.167** (1)	**Q.168** (2)	**Q.169** (4)	**Q.170** (4)
Q.171 (4)	**Q.172** (2)	**Q.173** (2)	**Q.174** (3)	**Q.175** (2)	**Q.176** (3)	**Q.177** (2)	**Q.178** (3)	**Q.179** (3)	**Q.180** (3)
Q.181 (2)	**Q.182** (3)	**Q.183** (2)	**Q.184** (2)	**Q.185** (2)	**Q.186** (1)	**Q.187** (3)	**Q.188** (1)	**Q.189** (4)	**Q.190** (3)
Q.191 (4)	**Q.192** (1)	**Q.193** (1)	**Q.194** (2)	**Q.195** (3)	**Q.196** (2)	**Q.197** (4)	**Q.198** (4)	**Q.199** (1)	**Q.200** (4)

SOLUTIONS

PHYSICS
SECTION-A

Q.1 (1)

For the centre of mass of the system to lie at diagonal BD, m_1 should be equal to m_3.

Q.2 (2)

$$K.E = \frac{P^2}{2m}$$

$$\frac{K.E_1}{K.E_2} = \frac{m_2}{m_1} = \frac{3}{4}$$

$$\frac{m_1}{m_2} = \frac{4}{3}$$

Q.3 (1)

$$F = \frac{dp}{dt} = \frac{d(3t+4)}{dt} = 3N$$

Q.4 (2)

For any type of collision the kinetic energy may or may not be conserved but linear momentum is conserved.

Q.5 (2)

$$|\vec{F}| = \left|\frac{\Delta\vec{P}}{\Delta t}\right|$$

$$= \left|\frac{0 - 0.2 \times 30}{0.2}\right| = 30N$$

Q.6 **(4)**

$$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$$

$$\Rightarrow 5 \times 10 + 20 \times 0 = 5 \times 0 + 20 \times v_2$$

$$\Rightarrow v_2 = 2.5 \text{ m/s}$$

Q.7 (2)

$$\vec{r} = \frac{m_1\vec{r} + m_2\vec{r}_2 + ...}{m_1 + m_2 + ...}$$

$$\vec{r} = \frac{\Sigma m_i \vec{r}_i}{\Sigma m}$$

$\vec{r}$ from centre of mass = 0

$\frac{\Sigma m_i r_i}{\Sigma m} = 0$

$\Sigma m_i r_i = 0$

Sum of the moments of all the particles in a system

Q.8 (1)

Both statements I and II are correct.

Q.9 (3)

$\tau = I\alpha$

$\alpha = \frac{\tau}{I} = \frac{10}{2} = 5\,rad/s^2$

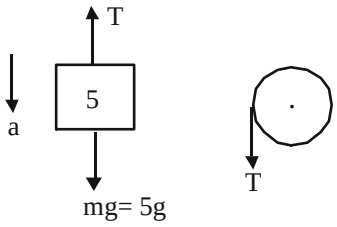
$\omega = \omega_0 + \alpha t$

$80 = 20 + 5(t)$

$5t = 60$

$t = 12$ sec.

Q.10 **(2)**



$5g - T = 5a$ ___(1)

$TR = I\alpha$ $(a = R\alpha = 0.5 \times 10 = 5\ m/s^2)$

$TR = \frac{Ia}{R}$; $T = \frac{Ia}{R^2}$

From equation (i)

$T = 50 - 5(5) = 25$ N

$T = \frac{I(5)}{\left(\frac{1}{2}\right)^2} = 20\,I \Rightarrow 20\,I = 25 \Rightarrow I = \frac{25}{20} = 1.25\,kgm^2$

Q.11 **(3)**

According to perpendicular axes theorem

$I_d + I_d = \frac{MR^2}{2}$ $\therefore I_d = \frac{MR^2}{4}$

Q.12 (4)

When $\Sigma\tau_{net} = 0$ about any point in universe (for a system)

Then, the system is said to be in rotational equilibrium.

Q.13 (4)

If $\vec{L}$ is conserved about origin

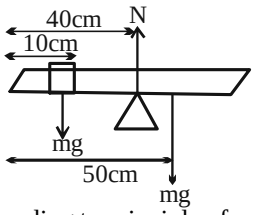
then $\vec{\tau}$ (about origin) = 0

Or, $\vec{r} \times \vec{F} = 0$

Thus $\vec{r} \parallel \vec{F}$

$\frac{\alpha}{2} = \frac{3}{-6} \Rightarrow \boxed{\alpha = -1}$

Q.14 (3)



According to principle of moments

$mg(30) = (0.3)\,g[10] \Rightarrow m = \frac{1}{10}kg$

m=100 gram

Q.15 (3)

Translational equilibrium

$F_{net} = 0$

Rotational equilibrium

$\tau_{net} = 0$

Torque about all points should be zero.

Q.16 (3)

$Li = L_f$

$MR^2\omega = (MR^2 + 2mR^2)\omega$

$\omega' = \frac{M\omega}{M+2m}$

Q.17 (1)

Ring $I = MR^2$

Solid disc $I = \frac{MR^2}{2}$

Annular disc $I = \frac{M\left(R_1^2 + R_2^2\right)}{2}$

Cylindrical disc $I = \frac{MR^2}{2}$

Q.18 (2)

$W = \Delta K.E = \frac{1}{2}I\left(w_f^2 - w_i^2\right)$

$= \frac{1}{2} \times 10\left(0 - (50)^2\right)$

$= -5 \times 2500$ $= -12500$ J

Q.19 (3)

$\tau = \frac{dL}{dt} = \frac{2-4}{4} = \frac{-1}{2}$

$L = I\omega \Rightarrow \omega = \frac{2-4}{0.2} = -10$

$P = \tau\omega$

$P = -10 \times \frac{-1}{2}$

$P = 5$ W

Q.20 (2)

$$\theta = \left(\frac{\omega+\omega_0}{2}\right)t = \left(\frac{300\times\frac{2\pi}{60}+0}{2}\right)\times 80$$

$$= 40\times 300\times\frac{2\pi}{60} = 200\times 2\pi$$

No. of revolution $= \frac{\theta}{2\pi} = 200$ –

Q.21 (4)

$T^2 \propto R^3$

$$\frac{R_1}{R_2} = \left(\frac{T_1}{T_2}\right)^{2/3} = \left(\frac{4}{32}\right)^{2/3} = \left(\frac{1}{8}\right)^{2/3} = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

Q.22 **(2)**

$$\Delta U = -\frac{GMm}{2R} - \left[-\frac{GMm}{R}\right]$$

$$= -\frac{GMm}{2R} + \frac{GMm}{R} = \frac{GMm}{2R}$$

Q.23 (4)

$$g = \frac{GM}{R^2} = \frac{G\rho\frac{4}{3}\pi R^3}{R^2}$$

$$g = \frac{4}{3}G\rho\pi R$$

$g \propto \rho R$

$$\frac{g_1}{g_2} = \frac{\rho_1 R_1}{\rho_2 R_2} \Rightarrow \frac{g_1}{g_2} = \frac{4}{1}\times\frac{1}{2} = \frac{2}{1}$$

Q.24 (1)

$$g = \frac{GM}{R^2}$$

M = same

$$g \propto \frac{1}{R^2}$$

$$\frac{g_e}{g_p} = \frac{R_p^2}{R_e^2} = \frac{(2R_e)^2}{R_e^2} = 4 \Rightarrow g_p = \frac{g_e}{4}$$

Q.25 (1)

We know, intesity of gravitational field inside a solid sphere.

$$I_g = \frac{GM}{R^3}x \qquad \therefore \quad I_g \propto x$$

Thus is it variable inside the sphere and proportional to the distance from cenre.

Q.26 (2)

We know,

$$v_e = \sqrt{\frac{2GM}{R}} \Rightarrow v_e \propto \frac{1}{\sqrt{R}}$$

$$\therefore \frac{v_e}{v_e} = \sqrt{\frac{R'}{R}} = \frac{1}{10} \Rightarrow R' = \frac{R}{100} = \frac{6400}{100} = 64\,\text{km}$$

Q.27 (4)

For escaping to infinity, the total energy of statellite should either be zero or some positive value.

Q.28 (1)

$$\text{K.E.} = \frac{GMm}{2r}$$

$$= \frac{GMm}{2(R+h)}$$

$a \rightarrow q$

$$\text{P.E} = \frac{-GMm}{r} = -\frac{Gmm}{R+h}$$

$b \rightarrow p$

$$\text{Total energy} = \frac{-GMm}{2r} = -\frac{GMm}{2(R+h)}$$

$c \rightarrow r$

$$E = \frac{1}{2}mV^2$$

Q.29 (2)

$$g\left(1-\frac{d}{R}\right) = \frac{g}{\left(1+\frac{h}{R}\right)^2},\ d = R/2$$

$$1 + \frac{h}{R} = \sqrt{2},\ h = R(\sqrt{2}-1)$$

$$h \cong R(1.4-1) = 0.4R$$

Q.30 (1)

$$-\frac{GM\times 2}{R} = -100$$

$$\frac{GM}{R} = 50$$

$$V_e = \sqrt{\frac{2GM}{R}} = \sqrt{2\times 50} = 10\,\text{m/s}$$

Q.31 (2)

$$g_{\text{planet}} = \frac{G(M/7)}{(R/2)^2} = \frac{4}{7}g_E$$

Therefore, $W_{Planet} = \frac{(700)}{g_E} \times \frac{4g_E}{7} = 400$ gm wt

Q.32 (1)
For satellite S moving elliptica; orbit around the earth net force will be towards centre of the earth .
(like centripetal force in circular motion)

Q.33 (4)

$mg_d = mg\left(1-\frac{d}{R}\right) = 0$

Q.34 (3)

$\frac{1}{8}\rho\frac{4}{3}\pi R^3 = \rho\frac{4}{3}\pi(R')^3$

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

$I_1\omega_1 = I_2\omega_2$

$\frac{2}{5}mR^2\left(\frac{2\pi}{T}\right) = \frac{2}{5}m\left(\frac{R}{2}\right)^2 \times \frac{2\pi}{T_2}$

$4T_2 = T$

$T_2 = \frac{24}{4} = 6$ hr

Q.35 (4)

$T_A = 8T_B$

$T^2 \alpha r^3$

$\left(\frac{T_A}{T_B}\right)^2 = \left(\frac{r_A}{r_B}\right)^3$

$(8)^2 = \left(\frac{r_A}{r_B}\right)^3 \Rightarrow \frac{r_A}{r_B} = 4 \Rightarrow v = \sqrt{\frac{Gm}{r}}$

$\frac{V_A}{V_B} = \sqrt{\frac{r_B}{r_A}} \Rightarrow \frac{V_A}{V_B} = \sqrt{\frac{1}{4}} = \frac{1}{2}$

SECTION-B

Q.36 (2)

$x_{cm} = \frac{2(1)+1(-4)+5x}{2+1+5} = 0$

$2-4+5x = 0 \Rightarrow x = \frac{2}{5}$

$y_{cm} = \frac{2(-2)+1(3)+5y}{2+1+5} = 0$

$-4+3+5y = 0 \Rightarrow y = \frac{1}{5}$

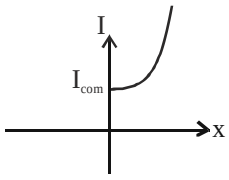
Q.37 (2)
Let plank moved by x in right side.
but $\Delta x_{cm} = 0$
$150(x) + 50(10+x) = 100(10-x)$

$3x + (10+x) = 20 - 2x$

$6x = 10 \Rightarrow x = \frac{5}{3}$m

Q.38 **(4)**

$I = I_{com} + Mx^2$



Q.39 (1)
We know,

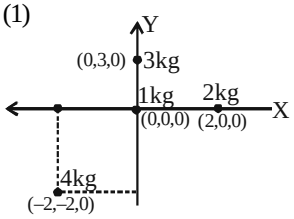
$I = \sum_{i=1}^{n} m_i r_i^2$

Also , $I = mk^2$

$\therefore k = \sqrt{\frac{I}{m}}$ and $\vec{L} = 2m\left(\frac{d\vec{A}}{dt}\right)$

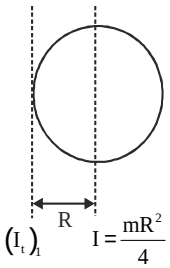
$\vec{\tau} = \vec{r} \times \vec{F}$

Q.40 (1)



From the graph, (about X-axis)
$I = 4(2)^2 + 3(3)^2$
$I = 16 + 27$
$I = 43\ kg\ m^2$

Q.41 (3)



$(I_t) = \frac{mR^2}{4} + mR^2 = \frac{5}{4}mR^2$

$mK_1^2 = \frac{5}{4}mR^2$

$K_1 = \frac{\sqrt{5}}{2}R$

$mK_2^2 = \frac{mR^2}{2} + mR^2$

$\Rightarrow K_2 = \frac{\sqrt{3}}{\sqrt{2}}R$

$K_1 : K_2 = \sqrt{5} : \sqrt{6}$

Q.42 (4)

$g_h = \frac{g}{\left(1+\frac{h}{R}\right)^2} = \frac{g}{9}$

$1+\frac{h}{R} = 3 \Rightarrow \frac{h}{R} = 2$

$h = 2R$

Q.43 (1)

We know,

(P.E. + K.E.) = (P.E. + K.E.),

$-\frac{G(4)(6)}{100} + 0 = -\frac{G(4)(6)}{10} + \frac{1}{2}(4)v^2$

$-\frac{24G}{100} + \frac{240}{100}G = 2v^2$

$v = \sqrt{\frac{108}{100}G} = \frac{3\sqrt{3G}}{5}$

Q.44 (4)

We know, orbital velocity, $v_0 = \sqrt{\frac{GM}{R+h}}$

And, Escape velocity, $v_e = \sqrt{\frac{2GM}{R+h}}$

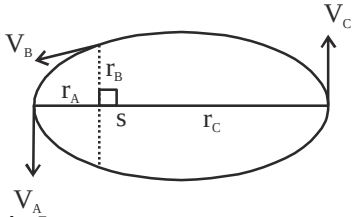
Also, Time period, $T = 2\pi\sqrt{\frac{(R+h)^2}{GM}}$

Q.45 (1)

$T = \frac{2\pi}{\sqrt{GM}}r^{3/2} \Rightarrow T^2 = \frac{4\pi^2R^3}{G\left(\frac{4}{3}\pi R^3 d\right)}(r = R)$

$T^2 = \frac{3\pi}{Gd}$

Q.46 (2)



As L = mvr = constant

and $r_C > r_B > r_A$

so $v_A > v_B > v_C$

$\Rightarrow K_A > K_B > K_C$

Q.47 (2)

(a) $K.E = \frac{GMm}{2r} \Rightarrow K.E. \propto \frac{1}{r}$

(b) $L = mvr = \sqrt[m]{\frac{GM}{r}}r$

$\Rightarrow L \propto \sqrt{r}$

(c) $P = mv = \sqrt[m]{\frac{GM}{r}} \Rightarrow P \propto \frac{1}{\sqrt{r}}$

(d) $T \propto r^{3/2} \Rightarrow f \propto \frac{1}{r^{3/2}}$

Q.48 (3)

$V_{max}r_{min} = V_{min} \times r_{max}$

$3 \times 10^4 \times r_{min} = 1 \times 10^3 \times 4 \times 10^4$

$\boxed{r_{min} = \frac{4}{3} \times 10^3 \text{ km}}$

Q.49 (3)

$g = \frac{3}{4}\pi GR\rho$

$\rho = \frac{3g}{4\pi GA}$

Q.50 (3)

Areal velocity is constant

$\therefore$ Time to cover large area would be greater Area along the path DAB < Area along path BCD

$\Rightarrow$ time along DAB < time along BCD

$\therefore \quad T_1 < T_2$

CHEMISTRY
SECTION-A

Q.51 (1)

$2NH_3(g) \rightleftharpoons N_2(g) + 3H_2(g), K_1$ ...(i)

$N_2(g) + O_2(g) \rightleftharpoons 2NO(g), K_2$ ...(ii)

$2H_2(g) + O_2(g) \rightleftharpoons 2H_2O(g), K_3$ ....(iii)

On applying 2 × (i) + 2 × (ii) + 3 × (iii);

We get

$4NH_3 + 5O_2 \rightleftharpoons 4NO + 6H_2O, K = K_1^2K_2^2K_3^3$

Q.52 **(3)**

$H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$

$\Delta n_g = 0$

$K_P = K_C(RT)^{\Delta n_g = 0}$

$K_P = K_C$

Q.53 (3)

$HCN(aq) \rightleftharpoons H^+(aq) + CN^-(aq)$

On adding $CN^-_{(aq)}$; cocentration of CN^-

increases which result in backward shift of reaction so concentration of H^+ ion decreases.

Q.54 (3)

$CO_2(g)+C(s) \rightleftharpoons 2CO(g)$

$K_P = \dfrac{(P_{CO})^2}{P_{CO_2}}$

Unit of K_P is $\dfrac{atm^2}{atm}$ = atm

Q.55 (4)

$A \rightleftharpoons 2B$, K_1^2 ....(i)

$3B \rightleftharpoons 2C + D$, K_2 ....(ii)

$2D \rightleftharpoons E + A$, $\dfrac{1}{K_3}$ ....(iii)

eq. (i) + (ii) + (iii)

$B + D \rightleftharpoons E + 2C$, $K = \dfrac{K_2}{K_3}K_1^2$

Q.56 (2)

On increasing pressure; physical equilibrium gets shifted towards more densed substance so melting of ice increased on increasing pressure as density of water is more than ice.

Q.57 (3)

$A_{(s)} + B_{(g)} \rightleftharpoons 2C_{(g)}$

$K_p = K_c (RT)^{\Delta ng}$

Here $\Delta ng = 2 - 1 = 1$

$K_p = K_c(RT)^1$

$K_C = K_P (RT)^{-1}$ $\boxed{x = -1}$

Q.58 (1)

$2H_2(g) + 2CO_2(g) \rightleftharpoons 2CO(g) + 2H_2O(g)$

Initial 2 2 0 0

At eqn 2 – y 2 – y y y

$K_C = \dfrac{[CO]^2[H_2O]^2}{[H_2]^2[CO_2]^2} = \dfrac{(y^2)(y^2)}{(2-y)^2(2-y)^2}$

$K_C = \dfrac{y^4}{(2-y)^4}$

Q.59 (2)

We knew that, $K_P = K_C (RT)^{\Delta ng}$

Δn_g = 1 (according to the given reaction)

$K_P = K_C(RT)$

Q.60 (3)

$NaNO_3(s) \rightleftharpoons NaNO_2(s) + 1/2O_2(g)$

At equilibrium, addition of solid substance has no effect on equilibrium but on increasing pressure equilibrium shift towards less gaseous moles i.e. backward direction.

Q.61 (3)

To form conjugate acid just add 1 H^+ to the given species or ion.

$HSO_4^- + H^+ \rightarrow H_2SO_4$

Q.62 (3)

Aqueous solution of salt of strong acid and weak base is acidic in nature and Ammonium sulphate is the salt of strong acid (H_2SO_4) and weak base(NH_4OH).

Q.63 (2)

$NaF(aq) \rightarrow Na^+(aq) + F^-(aq)$

0.01M 0.01M 0.01M

$CaF_2(s) \rightleftharpoons Ca^{2+}(aq) + 2F^-(aq)$

S S $2S + 0.01 \approx 0.01$

$K_{sp} = [Ca^{2+}][F^-]^2$

$K_{sp} = S \times [0.01]^2$

$S = \dfrac{K_{SP}}{[0.01]^2} = \dfrac{5.3\times10^{-11}}{1\times10^{-4}} = 5.3 \times 10^{-7}\ mol\ L^{-1}$

Q.64 (3)

pH of salt of strong base and weak acid

$pH = 7 + \dfrac{1}{2}\left[p^{K_a} + \log c\right]$

$= 7 + \dfrac{1}{2}[4.74 + \log 0.2]$

$= 8.88$

Q.65 (4)

(i) $CH_3COONa + HCl \rightarrow CH_3COOH + NaCl$

t = 0 2 1 0 0

t_{end} 1 0 1 1 0

We get acidic buffer solution after reaction.

(ii) $CH_3COOH + NaOH \rightarrow CH_3COONa + H_2O$

t = 0 2 1 0 0

t_{end} 1 0 1 1

We get buffer solution after reaction.

(iii) Given mixture is already a buffer solution.

Q.66 (3)

$BaCl_2(aq) \rightarrow Ba^{2+}(aq) + 2Cl^-(aq)$

0.1M 0.1M 0.2M

$AgCl(s) \rightleftharpoons Ag^+(aq) + Cl^-(aq)$

S S $S + 0.2 \approx 0.2$

$K_{sp} = [Ag^+][Cl^{-1}] = S \times 0.2$

$S = \dfrac{K_{sp}}{0.2} = \dfrac{10^{-10}}{0.2} = 5 \times 10^{-10}M$

Q.67 (1)

$AgCl \rightleftharpoons Ag^+ + Cl^-$

S S S

$AgNO_3 \rightleftharpoons Ag^+ + NO_3^-$

$AgNO_3$ is completely ionised. Due to common ion ($Ag^{\oplus}$) the dissociation of AgCl is supressed and hence, the solubility decreases.

Since K_{sp} is small, S << 0.01M

Thus, (0.01 + S) ≈ 0.01

$$S_{new} = \frac{K_{sp}}{(0.01)} = \frac{1.5\times10^{-10}}{(0.01)} = 1.5\times10^{-8}M$$

$= 1.5 \times 10^{-8} \times 143.5$

$= 2.15 \times 10^{-6}\ g\ L^{-1}$

The solubility of AgCl in water containing $Ag^{\oplus}$ (a common ion) is much less than that in pure water.

Q.68 (3)

(i) $K_w = [H^+]\,[OH^-] = 10^{-14}M^2$ at 25°C

(ii) $[H^+] = [OH^-] = 10^{-7}M$ only at 25°C

(iii) K_w depend on temperature

(iv) Molarity of water = 55.55M

Q.69 **(2)**

pH = 4.7

$\therefore [H^{\oplus}] = 10^{-4.7} = 2 \times 10^{-5}$

and $[OH^-] = \frac{K_W}{[H^+]} = \frac{10^{-14}}{2\times10^{-5}} = 5\times10^{-10}$

Q.70 (3)

On increasing temperature dissociaton of H_2O increases So concentration of H^+ and OH^- both increases so $K_w \uparrow$ but pK_W decreases so pH ↓

Dissociation of water is an endothermic process.

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Q.71 (4)

Since all of the given option are the example of buffer solution so in all cases pH will not change on dilution.

Q.72 (3)

We know that, $pH = -\log_{10}[H^+]$ or $[H^+] = 10^{-pH}$

Case-I : when pH = 2

$[H^+]_1 = 10^{-2}$ .....(i)

Case-II: when pH = 4

$[H^+]_2 = 10^{-4}$ .....(ii)

Applying (ii) / (i)

$$\frac{[H^+]_2}{[H^+]_1} = \frac{10^{-4}}{10^{-2}} = 10^{-2}$$

Thus, the cocentration of H^+ ions reduced by 100 times when the pH changes from 2 to 4.

Q.73 (1)

For anionic hydrolysis

$$pH = \frac{1}{2}pK_W + \frac{1}{2}[pK_a + \log C]$$

$$pH = \frac{1}{2}[pK_W + pK_a + \log C]$$

Q.74 (3)

$CaOCl_2$ can be written as Ca(OCl)Cl containing Ca^{2+}, OCl^{-1} and Cl^- ions so from OCl^{-1}, Oxidation of Cl is +1 and in Cl^- oxidation no. is –1.

Q.75 (1)

$$O = \overset{+2}{C} = \overset{0}{C} = \overset{+2}{C} = O$$

Oxidation number of middle carbon is zero.

Q.76 (3)

In acid is medium $Cr_2O_7^{2-}$ is converted into Cr^{3+} so its n-factor is 6 and FeC_2O_4 is converted into Fe^{3+} and CO_2 so its n-factor is 3.

No. of equ. of $Cr_2O_7^{2-}$ = No. of equ. of FeC_2O_4

$$(mol.\times n-factor)_{Cr_2O_4^{2-}} = (mol.\times n_f)_{FeC_2O_4}$$

$mol. \times 6 = 1 \times 3$

$$\text{mol of } C_2O_4^{-2} = \frac{3}{6} = \frac{1}{2}$$

Q.77 (2)

Na is metal and it can show only (+1) i.e. positive oxidation state in its compounds.

Q.78 (3)

In basic medium $KMnO_4$ oxidise I^- ion into iodate (IO_3^-) ion.

$$MnO_4^- + I^- \xrightarrow{OH^-} MnO_2 + IO_3^-$$

Q.79 (2)

(iv) O_2F_2 : O.No. of O is +1

(i) OF_2 : O.No. of O is +2

(ii) H_2O_2 : O.No. of O is –1

(iii) RbO_2 : O.No. of O is –1/2

Q.80 (3)
H_2S act only as reducing agent as S is in its lowest oxidation state of –2.

Q.81 (4)
$H_2O_2 \rightarrow H_2O + O_2$
$-1 \quad -2 \quad 0$
H_2O_2 is oxidized as well as reduced so it gets disproportionate.

Q.82 (4)
In acidic medium, MnO_4^- oxidize I^- into I_2 and it self gets reduced to Mg^{2+}
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Q.83 (3)
$\overset{+7}{Mn}O_4 + 1e^- \rightarrow \overset{+6}{Mn}O_4^{2-}$

Q.84 (1)
$2KMnO_4 + 5H_2O_2 + 3H_2SO_4 \longrightarrow 2MnSO_4 + 5O_2 + 8H_2O + K_2SO_4$
Sum of coefficients = 2 + 5 + 3 + 2 + 5 + 8 + 1 = 26

Q.85 (3)
$2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$

SECTION-B

Q.86 (2)

Q.87 (3)
$K_p = K_c(RT)^{\Delta n}$
For the given reaction, $\Delta n = 1 - 2 = -1$

$$\therefore \frac{K_p}{K_c} = (RT)^{-1} = \frac{1}{RT_c}$$

Q.88 (4)
$CO(g) + H_2O(g) \rightleftharpoons CO_2(g) + H_2(g)$
Initially 0.1 M 0.1 M 0 0
equi. 0.1-x 0.1-x x x

$$K_c = \frac{x^2}{(0.1-x)^2} \Rightarrow \sqrt{K_c} = \frac{x}{(0.1-x)}$$

$$\Rightarrow \frac{0.1-x}{x} = \frac{1}{\sqrt{K_c}} \Rightarrow \frac{[CO(g)]}{[CO_2(g)]} = \frac{0.1-x}{x} = \frac{1}{\sqrt{x}}$$

$$\Rightarrow \frac{[CO(g)]}{[CO_2(g)]} = \frac{1}{\sqrt{K_c}}$$

& $\Delta ng = 0$

$$K_p = K_c \therefore \frac{[CO]}{[CO_2]} = \frac{1}{\sqrt{K_p}}$$

Q.89 (2)
$CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$
For the given reaction
$K_P = P_{CO_2(g)}$
$K_P = 2 \times 10^5$ Pa = 2 bar

Q.90 (2)
$P_4(g) \rightleftharpoons 2P_2(g)$

t = 0 $\frac{3mol}{2L} \quad \frac{2mol}{2L}$
1.5 M 1M

$$Q_C = \frac{[P_2]^2}{[P_4]} = \frac{1^2}{1.5} = \frac{2}{3}$$

Q.91 (3)
$[OH^-] = 0.001 = 10^{-3}$ M
$pOH = -\log[OH^-] = -\log 10^{-3}$
pOH = 3
pH = 14 – pOH = 14 – 3 = 11

Q.92 (1)
Using Henderson's equation

$$pH = pK_a + \log \frac{[Salt]}{[Acid]}$$

$$pH = 4.75 + \log \frac{0.1}{0.1}$$

pH = 4.75

Q.93 (2)
no. of eqvivalent = N× V_L
$(n_{Eq})_{H_2SO_4} = 0.1 \times 0.1 = 0.01$
$(n_{Eq})_{Ba(OH)_2} = 0.1 \times 2 \times 0.1 = 0.02$
$(n_{Eq})_{Ba(OH)_2} > (n_{Eq})_{H_2SO_2}$
So solution will be basic and pH >7.

Q.94 (1)

$$pH = pK_a + \log \frac{[salt]}{[acid]}$$

$\because pK_a + pK_b = 14$
$pK_a + 10 = 14$
$pK_a = 14 - 10 = 4$
pH = 4 + log 1
pH = 4

Q.95 (2)
10^{-4} M KOH have
$[OH^-] = 10^{-4}$ M
$pOH = -10g[OH^-] = -\log 10^{-4} = 4$
pH = 14 – pOH = 14 – 4 = 10

Q.96 (4)
In $HClO_4$, *Cl* is in its highest oxidation state so it cannot show disproprotionation reaction.

Q.97 **(3)**

N_2O_5 cannot act as reducing agent because nitrogen is present in its highest oxidation state.

Q.98 (2)

$\overset{+2\ -1}{FeS_2} \longrightarrow \overset{+3}{Fe_2O_3} + \overset{+6}{SO_3}$

$1\times1 = 1$

$2\times7 = 14$

$n_{factor} = 1 + 14 = 15$

$\overset{+2\ +3}{FeC_2O_4} \longrightarrow \overset{+3}{Fe_2O_3} + \overset{+4}{CO_2}$

$1\times1 = 1$

$2\times1 = 2$

$n_{factor} = 1 + 2 = 3$

Q.99 (4)

$3\overset{0}{Br_2} + 6\overset{+4}{C}O_3^{2-} + 3H_2O \rightarrow 5Br^- + \overset{+5}{Br}O_3 + 6H\overset{+4}{C}O_3^-$

So here Br is reduced as well as oxidized.

Q.100 (3)

Decomposition redox reaction must have only one reactant and one of the product must be an element.

BIOLOGY-I
SECTION-A

Q.101 (3)

New NCERT Pg. No. 90

The bacterial cell wall is a crucial component that provides structural integrity and prevents the bacteria from bursting or collapsing under osmotic pressure. It maintains the shape and rigidity of the bacterial cell. The slime layer, capsule, and glycocalyx also provide protection and aid in evading the host's immune system but are not primarily responsible for preventing bursting or collapsing.

Q.102 (1)

New NCERT Pg. No. 101

In acrocentric chromosomes, the centromere is located close to one end, resulting in one very short arm and one very long arm. Metacentric chromosomes have centromeres in the middle, giving arms of equal length. Sub-metacentric chromosomes have centromeres slightly off-center, while telocentric chromosomes have centromeres at the very end, with only one arm visible.

Q.103 (4)

New NCERT Pg. No. 93

The erythrocyte (RBC) membrane is composed of approximately 52% proteins and 40% lipids, which are arranged in a bilayer. The lipid bilayer serves as a barrier, while the proteins perform various functions such as transport, signaling, and maintaining cell shape.

Q.104 (4)

New NCERT Pg. No. 91

Lysosomes are membrane-bound organelles found in eukaryotic cells and are involved in digestion and waste removal. Inclusion bodies like cyanophycean granules, phosphate granules, and glycogen granules are found in prokaryotes, serving as storage sites for nutrients.

Q.105 (2)

New NCERT Pg. No. 87, 88

- Anton Von Leeuwenhoek (a): First to observe live cells.
- Robert Brown (b): Discovered the nucleus.
- Flemming (c): Given chromatin name.
- Rudolf Virchow (d): Explained "*Omnis cellula e cellula*" (all cells come from pre-existing cells).

Q.106 (1)

New NCERT Pg. No. 94

- Statement I: As the polar molecules cannot pass through the nonpolar lipid bilayer, they require a carrier protein of the membrane to facilitate their transport across the membrane.
- Statement II: Some ions or molecules require energy-dependent transport (active transport) to move against their concentration gradient.

Q.107 (2)

New NCERT Pg. No. 101

The kinetochore is a disc-shaped protein structure found on each side of the centromere where spindle fibers attach during cell division, facilitating chromosome movement. Primary and secondary constrictions are other chromosomal regions, while telomeres are the ends of chromosomes.

Q.108 (3)

New NCERT Pg. No. 91

Mesosomes in bacteria are infoldings of the plasma membrane and play roles in DNA replication, cell wall formation, and respiration. However, they are not involved in photosynthesis, which is typically carried out by pigments found in structures like thylakoids in photosynthetic bacteria.

Q.109 (2)

New NCERT Pg. No. 90, 91, 96

Inclusion bodies are non-membrane-bound structures found in both prokaryotic and eukaryotic cells, often involved in storing nutrients like glycogen, lipids, or pigments. The other options are correctly matched.

Q.110 (2)
New NCERT Pg. No. 94
The middle lamella, a pectin-rich layer found between adjacent plant cells, is primarily made up of calcium pectate. It helps in cementing cells together, providing structural stability to plant tissues.

Q.111 (3)
New NCERT Pg. No. 89
The ostrich egg is the largest known single cell, which can be up to 15 cm in diameter. Mycoplasma is the smallest cell, RBCs are relatively small, and bacteria are unicellular organisms, not isolated single cells.

Q.112 (1)
New NCERT Pg. No. 98
Ribosomes, found in both prokaryotic and eukaryotic cells, translate mRNA into proteins. Ribosomes are composed of RNA and protein, not nucleic acids only, and are involved in protein synthesis, not lipid synthesis.

Q.113 (4)
New NCERT Pg. No. 100
The nucleolus is a dense region within the nucleus where ribosomal RNA (rRNA) is synthesized and assembled with proteins to form ribosomal subunits. Ribosomes themselves synthesize proteins, while nucleoplasm and lysosomes have other functions.

Q.114 (1)
New NCERT Pg. No. 110
In glycogen, the right end is called the reducing end and the left end is called the non-reducing end.

Q.115 (1)
New NCERT Pg. No. 105
Oxygen makes up the largest percentage of the human body by weight (around 65%). It is a major component of water and organic molecules, making it the most abundant element.

Q.116 (1)
New NCERT Pg. No. 106
- Assertion: The structure of an amino acid changes with the pH of the solution due to the ionization of amino ($-NH_2$) and carboxyl (-COOH) groups.
- Reason: The ionization state of these groups is influenced by the pH of the surrounding environment, which can lead to changes in the amino acid's structure.

Q.117 (2)
New NCERT Pg. No. 114
During an enzymatic reaction, the substrate forms a transition state that is unstable and short-lived. The enzyme stabilizes this transition state, lowering the activation energy required for the reaction.

Q.118 (3)
New NCERT Pg. No. 107
The given structure is a nucleotide consisting of a nitrogenous base (adenine), a sugar, and a phosphate group. A nucleoside lacks the phosphate group, containing only a nitrogenous base and sugar.

Q.119 (2)
New NCERT Page 118
Co-enzymes are also organic compounds but their association with the apoenzyme is only transient, usually occurring during the course of catalysis.

Q.120 (3)
New NCERT Pg. No. 109
Insulin is a hormone, not an enzyme. It regulates glucose levels in the blood. The other options are correctly matched: collagen is an intercellular substance, GLUT-4 enables glucose transport, and receptors are involved in sensory reception.

Q.121 (1)
New NCERT Pg. No. 116
The Michaelis constant (K_m) is defined as the substrate concentration at which an enzyme achieves half of its maximum velocity (V_{max}). It indicates the enzyme's affinity for its substrate.

Q.122 (4)
New NCERT Pg. No. 118
Coenzymes are organic molecules that act as cofactors in various enzyme-catalyzed reactions, often carrying chemical groups between enzymes. The other options include partially incorrect information.

Q.123 (2)
New NCERT Pg. No. 118
Catalase, an enzyme that breaks down hydrogen peroxide, is associated with an organic cofactor (haem) that is tightly bound to the enzyme.

Q.124 **(1)**
New NCERT Pg. No. 124
If karyokinesis (nuclear division) is not followed by cytokinesis (cytoplasmic division), it results in a multinucleated cell, known as a syncytium.

Q.125 (2)
New NCERT Pg. No. 122
The G_0 phase is a quiescent stage where cells exit the cell cycle and do not divide. However, it is not metabolically inactive; cells in G_0 are still metabolically active but do not proliferate unless required.

Q.126 (1)
New NCERT Pg. No. 122, 123, 124
The correct sequence of mitotic events is:
1. Condensation of genetic material (a).
2. Arrangement of chromosomes at the equator (d).
3. Splitting of centromere (b).
4. Segregation of sister chromatids (e).
5. Reassembly of the nuclear envelope (c).

Q.127 (4)
New NCERT Pg. No. 126
Crossing over occurs between non-sister chromatids of homologous chromosomes during prophase I of meiosis, leading to genetic recombination.

Q.128 (3)
New NCERT Pg. No. 121
Interphase is the phase between two M phases and lasts more than 95% of the cell cycle.
It is also known as the resting phase, but it does not involve nuclear division; instead, it is a period of growth and DNA replication.

Q.129 (4)
New NCERT Pg. No. 126
Diplotene is characterized by the separation of homologous chromosomes except at the chiasmata, not the disintegration of the nucleolus or nuclear envelope, which occurs in later stages.

Q.130 (2)
New NCERT Pg. No. 125
Meiosis II results in four haploid cells from a diploid parent cell. Each cell contains half the chromosome number of the original diploid cell.

Q.131 (3)
New NCERT Pg. No. 124
In animal cells, cytokinesis occurs through the formation of a cleavage furrow in the plasma membrane, which eventually splits the cell into two daughter cells.

Q.132 (1)
New NCERT Pg. No. 123
During metaphase, spindle fibers attach to the kinetochores of chromosomes, aligning them at the equatorial plate. This ensures accurate chromosome segregation during cell division.

Q.133 (1)
New NCERT Pg. No. 121
The G_1 phase corresponds to the interval between mitosis and the initiation of DNA replication. It is a period of cell growth and preparation for DNA synthesis.

Q.134 (2)
New NCERT Pg. No. 122
The M phase (mitosis) is considered the most dramatic phase because it involves visible structural changes, including chromosome condensation, spindle formation, and cell division.

Q.135 (1)
New NCERT Pg. No. 121
During the S phase, the amount of DNA per cell doubles as the chromosomes replicate, but the chromosome number remains the same.

SECTION-B

Q.136 (1)
New NCERT Pg. No. 98
Prokaryotic ribosomes are 70S, composed of 50S (large subunit) and 30S (small subunit). Eukaryotic ribosomes are 80S, composed of 60S and 40S subunits.

Q.137 (2)
New NCERT Pg. No. 89
- Mycoplasma (i): 0.3 µm (D).
- Bacteria (ii): 3-5 µm (C).
- Human RBC (iii): 7 µm (B).
- Viruses (iv): 0.02-0.2 µm (A).

Q.138 (1)
New NCERT Pg. No. 96
- Statement I: Proteins synthesized by ribosomes on the ER are modified and packaged in the Golgi body (GB).
- Statement II: The cis (forming face) and trans (maturing face) of the Golgi apparatus are interconnected but functionally distinct.

Q.139 (3)
New NCERT Pg. No. 88
In 1838, Matthias Schleiden, a German botanist, examined a large number of plants and observed that all plants are composed of different kinds of cells which form the tissues of the plants.

Q.140 (1)
New NCERT Pg. No. 95
- The given diagram is of Golgi apparatus.
- (c) It is single membranous.
- (d) Present in both plants and animals.
- (e) It is a part of endomembrane system.

Q.141 (2)
New NCERT Pg. No. 116
Inorganic catalysts can function at a wide range of temperatures, not just within the 25-45°C range. The other statements are correct: enzymes denature at high temperatures, are inactive at low temperatures, and work best at optimal pH and temperature.

Q.142 (1)
New NCERT Pg. No. 111, 112
- Primary structure (a): Positional information of amino acids in a protein (iv).
- Tertiary structure (b): 3-D view of a protein (iii).
- Secondary structure (c): Right-handed helices are observed (ii).
- Quaternary structure (d): Assembly of more than one polypeptide or subunits (i).

Q.143 (4)
New NCERT Pg. No. 110
These three are polysaccharides. Glycogen is the storage form in animals, starch in plants, and cellulose provides structural support in plant cell walls. The other options contain monosaccharides or disaccharides.

Q.144 (2)
New NCERT Pg. No. 106
- Valine (i): Neutral (B).
- Lysine (ii): Basic (A).
- Tyrosine (iii): Aromatic (D).
- Glutamic acid (iv): Acidic (C).

Q.145 (1)
New NCERT Pg. No. 111, 112
- Statement I: Correct. Proteins have an N-terminal (first amino acid) and a C-terminal (last amino acid).
- Statement II: Correct. Adult human haemoglobin consists of two alpha and two beta subunits.

Q.146 (4)
New NCERT Pg. No. 126
In oocytes of some vertebrates, the diplotene stage of prophase I can last for months or even years, allowing the cell to prepare for the completion of meiosis during fertilization.

Q.147 (4)
New NCERT Pg. No. 125
Mitosis is important for growth (a), cell repair (b), and restoring the nucleo-cytoplasmic ratio (c). It does not lead to variation, which is a characteristic of meiosis (d).

Q.148 (2)
New NCERT Pg. No. 123
The start of metaphase (second phase of mitosis) is marked by the complete disintegration of the nuclear envelope, allowing chromosomes to align at the spindle equator.

Q.149 (1)
New NCERT Pg. No. 125
Meiosis I is a reductional division because homologous chromosomes separate during anaphase I, reducing the chromosome number by half.

Q.150 (3)
New NCERT Pg. No. 126, 127
B: In Diakinesis, terminalization of chaismata occurs.
C: Crossing over takes place in Pachytene.

BIOLOGY-II
SECTION-A

Q.151 (3)
New NCERT Pg. No. 88
Matthias Schleiden was a botanist, not a zoologist. He proposed that plants are made of cells. The other options are correct: unicellular organisms can independently exist, structures less than a complete cell are not viable, and Schleiden and Schwann together formulated the cell theory.

Q.152 (1)
New NCERT Pg. No. 98
The cytoskeleton is an elaborate network of protein filaments(microtubules, microfilaments, and intermediate filaments) present in the cytoplasm of eukaryotic cells, providing structural support, intracellular transport, and cell division.

Q.153 (4)
New NCERT Pg. No. 96, 97
The cristae are formed by the inner membrane of mitochondria, not the outer membrane. The other options are correct: mitochondria are not easily visible without specific stains, their number correlates with cellular activity, and they divide by fission.

Q.154 (1)
New NCERT Pg. No. 99, 100
The centriole consists of cylindrical structures made of microtubules and helps in forming spindle fibers. However, the centrosome is the region that contains centrioles, not the cylindrical structures themselves. The other options correctly describe centrioles.

Q.155 (3)
New NCERT Pg. No. 98
Microbodies (e.g., peroxisomes and glyoxysomes) are small, membrane-bound organelles found in eukaryotic cells. They are not part of the cytoskeleton, which consists of microtubules, microfilaments, and intermediate filaments.

Q.156 (1)
New NCERT Pg. No. 102
Microbodies are found in plant and animal cells, not in bacteria. They contain various enzymes for metabolic processes, such as hydrogen peroxide detoxification in peroxisomes.

Q.157 (3)
New NCERT Pg. No. 98
Ribosomes are composed of ribosomal RNA (rRNA) and proteins. DNA is not a component of ribosomes, which primarily function in translating mRNA into proteins.

Q.158 (3)
New NCERT Pg. No. 98
The Svedberg unit (S) is a measure of the sedimentation rate during ultracentrifugation, reflecting both size and density of macromolecules like ribosomes. It is not a direct measure but an indirect one.

Q.159 (3)
New NCERT Pg. No. 91, 96, 99
- A: Inclusion bodies are membrane bound structures present in cytoplasm. Incorrect.
- B: All eukaryotic cells are non identical. Correct.
- C: Both cilia and flagella emerge from basal bodies derived from centrioles. Correct.
- D: Materials from the ER fuse with the cis face of the Golgi apparatus and move towards the trans face for further modification and sorting. Incorrect.

Q.160 (1)
New NCERT Pg. No. 94
- Osmosis (A): Correctly matched, as it is the movement of water by diffusion across a selectively permeable membrane.
- Passive transport (B): Incorrectly defined. Passive transport does not require energy and occurs along the concentration gradient, not against it.
- Active transport (C): Incorrectly matched, as it involves the movement of molecules against the concentration gradient with energy expenditure.

Q.161 (1)
New NCERT Pg. No. 94
Algal cell walls are composed of cellulose, galactans, mannans, and sometimes minerals like calcium carbonate ($CaCO_3$). These components provide structural support and protection. The other options include components like hemicellulose and pectins, which are more typical of higher plant cell walls.

Q.162 (4)
New NCERT Pg. No. 96, 97
Lysosomal enzymes (hydrolases) are active in an acidic environment, not a basic one. The acidic pH inside lysosomes is maintained by proton pumps. The other statements are correct: elaioplasts store oils and fats, plastids are found in plant cells and some protists like euglenoids, and the tonoplast facilitates ion transport into the vacuole.

Q.163 (1)
New NCERT Pg. No. 90, 91
- Statement I: Eukaryotic cells have a well-defined nucleus, while prokaryotic cells lack a true nucleus. Correct
- Statement II: Both cell types have a cytoplasm, a semi-fluid matrix that occupies most of the cell's volume and facilitates metabolic activities. Correct.

Q.164 (2)
New NCERT Pg. No. 91
Fimbriae are short, hair-like structures on the bacterial surface that help in attaching to surfaces such as rocks or host tissues. The hook, filament, and basal body are parts of the bacterial flagellum involved in motility, not attachment.

Q.165 (3)
New NCERT Pg. No. 105, 111
- Statement a: Correct. The properties of amino acids are determined by the amino, carboxyl, and R groups.
- Statement b: Incorrect. A nitrogenous base attached to a sugar is called a nucleoside, not a nucleotide.
- Statement c: Incorrect. Adenylic acid, thymidylic acid, and guanylic acid are nucleotides, not nucleic acids.

Q.166 (1)
New NCERT Pg. No. 110
In polysaccharides, monosaccharides are linked by glycosidic bonds, while in polypeptides, amino acids are linked by peptide bonds.

Q.167 (1)
New NCERT Pg. No. 107
The given amino acids are correctly identified as:
A: Alanine
B: Serine
C: Glycine

Q.168 (2)
New NCERT Pg. No. 118
Nicotinamide adenine dinucleotide (NAD) is a coenzyme derived from niacin (vitamin B3). It plays a crucial role in redox reactions in cellular respiration.

Q.169 (4)
New NCERT Pg. No. 115
In the reaction, "S" represents the substrate and "P" represents the product. The enzyme (E) catalyzes the conversion of the substrate to the product through the formation of intermediate complexes.

Q.170 (4)
New NCERT Pg. No. 118
Lyases catalyze the breaking of bonds by means other than hydrolysis or oxidation, such as the addition or removal of groups to form double bonds. Hydrolysis of esters and ethers is carried out by hydrolases, not lyases.

Q.171 (4)
New NCERT Pg. No. 107
The given structure is that of lecithin, a phospholipid found in cell membranes. Lecithin plays a role in maintaining membrane fluidity and structure.

Q.172 (2)
New NCERT Pg. No. 106, 109, 110
- Statement a: Correct. Collagen is the most abundant protein in animals.
- Statement d: Correct. Water is the most abundant chemical in living organisms.
- Statement b: Incorrect. DNA is a heteropolymer, while lipids are not polymers.
- Statement c: Incorrect. Arachidonic acid has 20 carbon atoms, not 16.

Q.173 (2)
New NCERT Pg. No. 117
- Statement I: Correct. Competitive inhibitors resemble the substrate and bind to the active site of the enzyme, inhibiting its activity.
- Statement II: Incorrect. Competitive inhibitors are often used in drug design to control bacterial pathogens.

Q.174 (3)
New NCERT Pg. No. 106
Adenylic acid is a nucleotide composed of adenine, ribose sugar, and a phosphate group. A nucleoside lacks the phosphate group.

Q.175 (2)
New NCERT Pg. No. 123
Chromosomes are most condensed and aligned at the equator during metaphase, making it the best stage for studying chromosome morphology.

Q.176 (3)
New NCERT Pg. No. 121
If a cell has 48 chromosomes in the G_1 phase, then during prophase I of meiosis, homologous chromosomes pair up, forming 24 bivalents (each consisting of two homologous chromosomes).

Q.177 (2)
New NCERT Pg. No. 122
The M phase (mitosis) is the most dramatic phase of the cell cycle, involving the major reorganization of cellular components, including chromosome condensation, spindle formation, and cytokinesis.

Q.178 (3)
New NCERT Pg. No. 126
The enzyme recombinase plays a crucial role during prophase I of meiosis, particularly in the process of genetic recombination, where it facilitates crossing over between homologous chromosomes.

Q.179 (3)
New NCERT Pg. No. 121
In human cells, the cell cycle typically takes around 24 hours, while in yeast cells, the cell cycle duration is much shorter, around 90 minutes.

Q.180 (3)
New NCERT Pg. No. 124
The given diagram likely represents anaphase, where the centromeres split, and the sister chromatids are pulled to opposite poles by spindle fibers.

Q.181 (2)
New NCERT Pg. No. 125
- Statement I: Correct. Meiosis II resembles mitosis in that sister chromatids separate.
- Statement II: Incorrect. Meiosis I involves recombination between non-sister chromatids of homologous chromosomes, not between sister chromatids.

Q.182 (3)
New NCERT Pg. No. 126
A bivalent consists of two homologous chromosomes, each with two chromatids, for a total of four chromatids and two centromeres.

Q.183 (2)
New NCERT Pg. No. 121
In the S phase of the cell cycle, DNA replication occurs, resulting in 2n chromosomes with 8C DNA content (double the original amount), but the chromosome number remains the same.

Q.184 (2)
New NCERT Pg. No. 123, 124
In metaphase, there are 40 chromosomes aligned at the equator. During anaphase, each chromosome splits into two chromatids, resulting in 80 chromatids.

Q.185 (2)
New NCERT Pg. No. 128
Meiosis and fertilization together ensure the maintenance of chromosome number across generations. Meiosis reduces the chromosome number in gametes, and fertilization restores the diploid state in the zygote.

SECTION-B

Q.186 (1)
New NCERT Pg. No. 96, 97, 99
- Vacuole (a): Helps in excretion in Amoeba.
- Amyloplast (b): Stores starch.
- Cytoskeleton (c): Helps in motility.
- Centrioles (d): Form spindle apparatus during cell division.

Q.187 (3)
New NCERT Pg. No. 95
The endoplasmic reticulum (ER) divides the cell into two distinct compartments: luminal (inside ER) and extra-luminal (outside ER). The other options are correct: RER is involved in protein synthesis, SER is involved in lipid synthesis, and steroidal hormones are synthesized in SER in animal cells.

Q.188 (1)
New NCERT Pg. No. 88
The cytoplasm is the site of numerous metabolic reactions essential for life. It contains enzymes and molecules that drive processes such as glycolysis, protein synthesis, and cell division. The reason correctly explains why the cytoplasm is the main arena for cellular activities.

Q.189 (4)
New NCERT Pg. No. 97, 98
Mitochondria and chloroplasts are organelles with their own genetic material (DNA), allowing them to replicate independently of the nucleus. These organelles are believed to have originated from symbiotic bacteria.

Q.190 (3)
New NCERT Pg. No. 94
Plasmodesmata are microscopic channels that traverse the cell walls of plant cells, connecting the cytoplasm of neighbouring cells, facilitating the movement of materials between them.

Q.191 (4)
New NCERT Pg. No. 110
- Statement I: Incorrect. Cellulose does not contain complex helices and hence cannot hold I_2.
- Statement II: Incorrect. Cellulose is a homopolysaccharide, but it does not contain complex helices; instead, it forms linear chains that provide structural support.

Q.192 (1)
New NCERT Pg. No. 109

Component	% of the total cellular mass
Water	70-90
Proteins	10-15
Carbohydrates	3
Lipids	2
Nucleic acids	5-7
Ions	1

Q.193 (1)
New NCERT Pg. No. 115
The steps in the catalytic cycle of an enzyme are as follows:
1. Substrate binds to the enzyme's active site (iv).
2. The enzyme alters its shape to fit the substrate more tightly (iii).
3. The enzyme breaks the chemical bonds of the substrate (ii).
4. The enzyme releases the products, and the enzyme is free to bind another substrate (i).

Q.194 (2)
New NCERT Pg. No. 115
When a substrate binds to the active site, the enzyme undergoes an induced fit, altering its shape to tightly accommodate the substrate and facilitate the reaction.

Q.195 (3)
New NCERT Pg. No. 104, 105
The nitrogen content in the earth's crust is much lower than in living organisms. Carbon and hydrogen are more abundant in living organisms than in the earth's crust. Silicon is abundant in the crust but not in living organisms.

Q.196 (2)
New NCERT Pg. No. 125
Mitosis is also called equational division because it produces two daughter cells with the same number of chromosomes as the parent cell, maintaining genetic consistency.

Q.197 (4)

New NCERT Pg. No. 126

Zygotene is characterized by the pairing of homologous chromosomes (synapsis), the appearance of the synaptonemal complex, and the formation of bivalents. Chiasmata formation occurs later during the diplotene stage.

Q.198 (4)

New NCERT Pg. No. 126, 127

Bivalents (paired homologous chromosomes) align on the equatorial plate during metaphase I of meiosis, not during mitosis. The other statements are correct: sister chromatids remain attached during anaphase I, meiosis II resembles mitosis, and prophase I of meiosis is more complex than prophase of mitosis.

Q.199 (1)

New NCERT Pg. No. 124, 127

The correct match is

A - S - anaphase of mitosis

B - P - anaphase of meiosis I

C - Q - Metaphase of mitosis

D - R - Prophase of meiosis I

Q.200 (4)

New NCERT Pg. No. 126

Segregation, the separation of homologous chromosomes, occurs during anaphase I, not prophase I. Synapsis, terminalization, and chiasmata formation all occur during prophase I.