ANSWER KEY
FULL TEST-04

PHYSICS

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

CHEMISTRY

Q.46 (2)	**Q.47** (2)	**Q.48** (2)	**Q.49** (1)	**Q.50 (3)**	**Q.51** (1)	**Q.52** (1)	**Q.53** (2)	**Q.54** (2)	**Q.55 (3)**
Q.56 (1)	**Q.57** (3)	**Q.58** (2)	**Q.59 (1)**	**Q.60 (1)**	**Q.61** (2)	**Q.62** (4)	**Q.63 (A)**	**Q.64 (2)**	**Q.65 (3)**
Q.66 (3)	**Q.67 (2)**	**Q.68** (2)	**Q.69** (2)	**Q.70** (2)	**Q.71** (1)	**Q.72** (3)	**Q.73** (4)	**Q.74** (2)	**Q.75** (4)
Q.76 (3)	**Q.77** (4)	**Q.78** (1)	**Q.79 (4)**	**Q.80** (1)	**Q.81 (2)**	**Q.82 (4)**	**Q.83 (1)**	**Q.84** (2)	**Q.85** (1)
Q.86 (2)	**Q.87** (2)	**Q.88** (4)	**Q. 89** (1)	**Q.90 (2)**					

BIOLOGY

Q.91 (2)	**Q.92** (1)	**Q.93** (3)	**Q.94** (3)	**Q.95** (3)	**Q.96** (2)	**Q.97** (1)	**Q.98** (2)	**Q.99** (2)	**Q.100** (1)
Q.101 (1)	**Q.102** (3)	**Q.103** (3)	**Q.104** (1)	**Q.105** (4)	**Q.106** (1)	**Q.107** (2)	**Q.108** (2)	**Q.109** (3)	**Q.110** (3)
Q.111 (4)	**Q.112** (1)	**Q.113** (1)	**Q.114** (3)	**Q.115** (2)	**Q.116** (3)	**Q.117** (1)	**Q.118** (4)	**Q.119** (1)	**Q.120** (4)
Q.121 (2)	**Q.122** (2)	**Q.123** (1)	**Q.124** (3)	**Q.125** (1)	**Q.126** (2)	**Q.127** (3)	**Q.128** (2)	**Q.129** (3)	**Q.130** (4)
Q.131 (2)	**Q.132** (3)	**Q.133** (2)	**Q.134** (1)	**Q135** (4)	**Q.136** (2)	**Q.137** (1)	**Q.138** (2)	**Q.139** (4)	**Q.140** (3)
Q.141 (4)	**Q.142** (2)	**Q.143** (2)	**Q.144** (2)	**Q.145** (3)	**Q.146** (2)	**Q.147** (3)	**Q.148** (1)	**Q.149** (2)	**Q.150** (2)
Q.151 (1)	**Q.152** (2)	**Q.153** (2)	**Q.154** (4)	**Q.155** (4)	**Q.156** (3)	**Q.157** (3)	**Q.158 (1)**	**Q.159** (4)	**Q.160** (2)
Q.161 (2)	**Q.162** (2)	**Q.163** (4)	**Q.164** (3)	**Q.165** (2)	**Q.166** (1)	**Q.167** (1)	**Q.168** (1)	**Q.169** (3)	**Q.170** (1)
Q.171 (2)	**Q.172** (3)	**Q.173** (4)	**Q.174** (2)	**Q.175** (3)	**Q.176** (2)	**Q.177** (3)	**Q.178** (3)	**Q.179** (1)	**Q.180** (2)

Hints & Solutions

Q.1 (2)

(a) Torque, $\tau = rf = [M^1L^2T^{-2}]$ a $\rightarrow$ (ii)

(b) energy density $= \frac{\text{energy}}{\text{volume}} = \frac{\left[M^1L^2T^{-2}\right]}{\left[L^3\right]} = \left[M^1L^{-1}T^{-2}k^0\right]$

$b \rightarrow$ (iv)

(c) Angular momentum = rp = $[L^1]\,[M^1L^1T^{-1}]$

$= [M^1L^2T^{-1}]$

$c \rightarrow$ (iii)

(d) $Q = MS\Delta T$

$$\Rightarrow S = \frac{Q}{M\Delta T} = \frac{\left[M^1L^2T^{-2}\right]}{\left[M^1K^1\right]} = \left[M^0L^2T^{-2}K^{-1}\right]$$

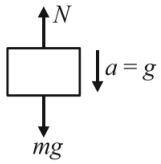
Q.2 (3)

Area of v-t graph = Displacement

$$\frac{1}{2} \times 2 \times 10 + 2 \times 10 + \frac{1}{2} \times 2 \times 10 = 40 \text{ m}$$

$$V_{av} = \frac{40}{T} = \frac{40}{7} = 5.7 \text{ m/s}$$

Q.3 **(3)**

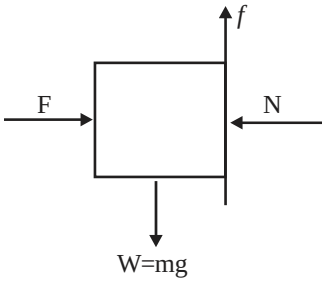


mg – N = ma

N = mg – mg = 0

As N = 0, so frictional force on the block is zero.

Q.4 (2)



N = F

$f = \mu N = \mu F$

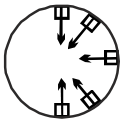
$f = mg$

$\mu F = mg = W$

Q.5 (4)

The force acting by the surface on the block is perpendicular to the displacement throughout the motion of the particle. Hence, work done by the surface on the block during its motion from bottom to top is zero.

$\therefore$ Statement II is correct



Resultant of normal reaction force from bottom to the top is not zero.

$\therefore$ Impulse imparted by the surface on the block from bottom to the top is not zero. Hence, statement 1 is incorrect.

Q.6 (4)

Given (V = 36 km/hr)

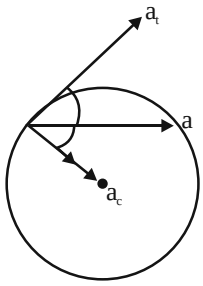
$= 36 \times \frac{5}{18}$

= 10 m/s

$a_t = 0.5\ m/s^2$

$a_c = \frac{V^2}{R} = \frac{10 \times 10}{50} = 2 m/s^2$

$a_{net} = \sqrt{(2)^2 + (1/2)^2} = \frac{\sqrt{17}}{2} m/s^2$



Q.7 **(2)**

$W_{mg} + W_{friction} = KE_f - KE_i$

$mgh + (\mu mg)\ (x)\ (-1) = 0 - 0$

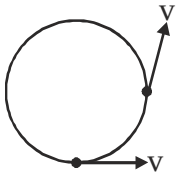
$(20)\ (1) - (0.4)\ (20)\ x = 0$

$20 = 0.4 \times 20\ x$

$\Rightarrow\ x = \frac{1}{0.4} = \frac{10}{4} = 2.5$ m

Q.8 (2)

(A)



In a complete cycle, net displacement is zero. So, the average velocity is zero.

Statement A is correct.

(B) In circular motion, at every instant direction changes. So, the velocity changes at every point

Statement B is also correct.

(C) In non-uniform circular motion speed of the particle changes. So, the centripetal acceleration is also changed.

$a_c = \frac{v^2}{r}$ $\qquad v \uparrow a_c \uparrow$

$v \downarrow a_c \downarrow$

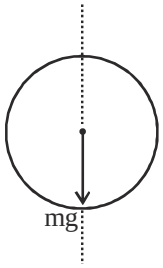
Q.9 (2)

$a = \frac{\text{Applied force} - \text{Kinetic friction}}{\text{mass}}$

$= \frac{100 - 0.5 \times 10 \times 10}{10} = 5 m/s^2$

Q.10 (2)

If force passes through the point where torque is to be calculated then torque of that force is zero.



$\therefore$ (Torque)$\tau = 0$

$\therefore \frac{\Delta L}{\Delta t} = 0$

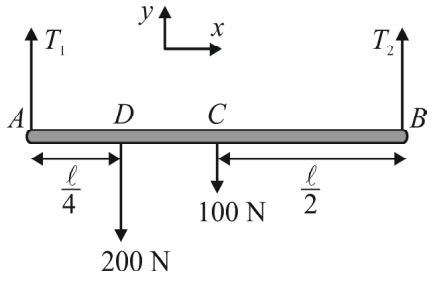
$\Delta L = 0$

$L_f = L_i$

$\therefore$ Angular momentum will remain conserved

Q.11 (2)

Free body diagram of the rod is shown in the figure:



Translational equilibrium requires

$\Sigma F_y = 0$

$\Rightarrow T_1 + T_2 = 200 + 100 = 300N$ ...(i)

Rotational equilibrium: Applying the condition about A, we get T_2.

$$\sum \vec{\tau}_A = 0 \Rightarrow -200\left(\frac{\ell}{4}\right) - 100\left(\frac{\ell}{2}\right) + T_2\ell = 0$$

$T_2 = 100\ N$

From equation (i)

$T_1 = 200\ N$

Ratio, $\frac{T_1}{T_2} = \frac{200N}{100N} = 2:1$

(NEW NCERT 11th Page No. 109, 110, 111, 112, 113)

Q.12 (4)

$$\boxed{V_\infty = \sqrt{V^2 - V_e^2}}$$

Given that

$V = 2V_e$

So,

$$V_\infty = \sqrt{(2V_e)^2 - V_e^2}$$

$$V_\infty = \sqrt{3}V_e = 11.2\sqrt{3}\ \text{km/s}$$

Q.13 (3)

$y_1 = 3\sin(10t + \phi)$

$$v_1 = \frac{dy_1}{dt} = 30\cos(10t + \phi)$$

$$v_1 = 30\sin\left(10t + \phi + \frac{\pi}{2}\right)$$

$y_2 = 5\cos(10t)$

$$v_2 = \frac{dy_2}{dt} = -50\sin(10t)$$

$= -50\sin 10t$

$= 50\sin(10t + \pi)$

Phase difference between

$= \Delta\phi = \phi_1 - \phi_2$

$= (10t + \phi + \frac{\pi}{2}) - (10t + \pi)$

$= \phi - \frac{\pi}{2}$

Q.14 (2)

$V_p = -V_W \times$ slope

V_W is negative

$\therefore$ At A, B, H slope is + *ve*, therefore particle velocity is upwards

At D, E, F slope is negative, therefore particle velocity is downward.

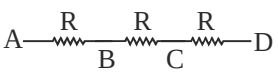
Q.15 (3)

$$\frac{V}{2\ell_1} = \frac{5V}{4\ell_2}\ (l_2 = \text{length of closed organ pipe})$$

$$L_1 = \frac{2}{5}\ell_2 = \frac{2}{5} \times 20 = 8\text{cm}$$

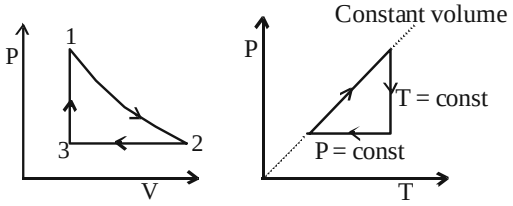
Q.16 **(3)**

Equivalent electrical circuit will be as shown infigure.



Temperature difference between A and D is180°C which is equally distributed in all therods. Therefore, temperature differencebetween A and B will be 60°C or temperatureof B should be 140°C.

Q.17 (3)



$1 \rightarrow 3$: isochoric process

$\Downarrow$

V = constant

$1 \rightarrow 2$ isothermal

$2 \rightarrow 3$ isobaric

Q.18 **(2)**

$$\Delta L = \frac{FL}{AY}$$

$\Delta L \propto F$

$$\frac{\Delta L_1}{\Delta L_2} = \frac{T_1}{2T_1} \Rightarrow \Delta L_2 = 2\ell$$

Q.19 (1)

$$T_{mix} = \frac{M_A S_A T_A + M_B S_B T_B}{M_A S_A + M_B S_B}$$

$$26 = \frac{M_A S_A (30) + MS_B (20)}{MS_A + MS_B}$$

$26\ S_A + 26\ S_B = 30S_A + 20S_B$

$6S_B = 4S_A$

$$\frac{S_A}{S_B} = \frac{6}{4} = \frac{3}{2}$$

Q.20 (3)

Pressure at B = $\rho g(2\ell)$

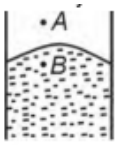
$$\frac{F}{A} = 2\rho g\ell$$

$F = 2\rho g\ell\ A_0$

Q.21 **(1)**

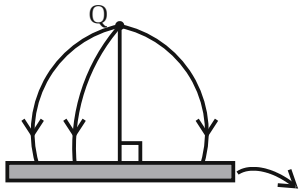
Rise or fall of liquid in capillary tube depends on angle of contact which may be acute, obtuse or right angle.

For a glass capillary having mercury $P_B > P_A$, excess pressure is always on the concave side.



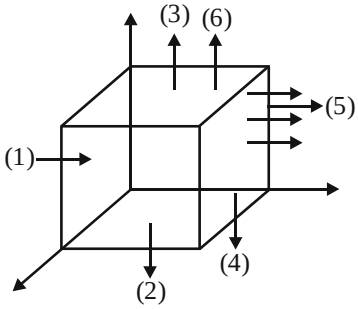
Q.22 (1)

Electsic field lines are always pespendicular to the onducting surface i.e. metal they originate from positive charge and terminate on negative charge.



Negative charge induced upper laye of the metal

Q.23 **(2)**



Net flux through the cube = $\phi_1 + \phi_2 + \phi_3 + \phi_4 + \phi_5 + \phi_6$

Flux due to surface (2), (3), (4) and (6) is zero because $\vec{E} \perp \vec{A}$ or $\theta = 90°$.

For surface (1), $E = 100(0)^3 = 0$

$\therefore \quad \phi_1 = EA\cos\theta = 0$

$\therefore$ Net flux is only due to surface (5)

$\therefore \quad \phi_{net} = \phi_5$

$= E_5 A\cos 0$

$= (100\,a^3)\,a^2(1)$

$= 100\,a^5$

According to Gauss's law, $\phi_{net} = \frac{q_{sin}}{\varepsilon_0}$

$q_{in} = \phi_{net}\varepsilon_0$

$\therefore \quad q_{in} = 100\,a^5\varepsilon_0$

Answer (2)

Q.24 (3)

$E = Ax\hat{i} + Ay\hat{j}$

$E = -\frac{\partial v}{\partial x}\hat{i} - \frac{\partial v}{\partial y}\hat{j}$

$v = \int E d\vec{r} = \int Axdx + \int Aydy \qquad (d\vec{r} = d\vec{x} + d\vec{y})$

$v = \left[\frac{Ax^2}{2} + \frac{Ay^2}{2}\right]_{(0,6)}^{(10,20)}$

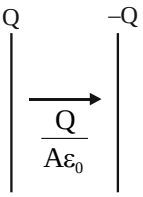
$= \frac{A(10)^2}{2} + \frac{A(20)^2}{2}$

$= 50A + 200\,A$

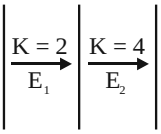
$= 250A$

$= 2500V$

Q.25 (1)

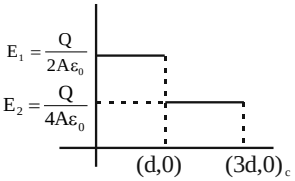


Electric field inside capacitor when no dielectric between the plates $E = \frac{Q}{A\varepsilon_0}$ If dielectric is inserted between the plates $E = \frac{Q}{KA\varepsilon_0}$ $\therefore$ If $K \uparrow E \downarrow$

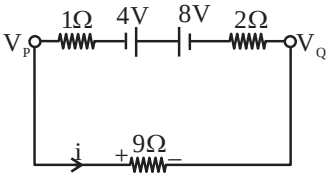


$E_1 = \frac{Q}{2A\varepsilon_0}$

$E_2 = \frac{Q}{4A\varepsilon_0}$



Q.26 (1)

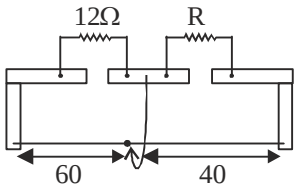


$i = \frac{8-4}{1+2+9} = \frac{4}{12} = \frac{1}{3}A$

$V_P - i \times 9 = V_Q$

$V_P - V_Q = 9 \times \frac{1}{3} = 3\,\text{Volt}$

Q.27 (2)



$$\frac{12}{60}=\frac{R}{40}$$

$R = 8\,\Omega$

$$R=\frac{\rho\ell}{A}=8$$

$$\rho=\frac{8\times0.1\times10^{-6}}{0.5}=1.6\times10^{-6}\,\Omega\,m$$

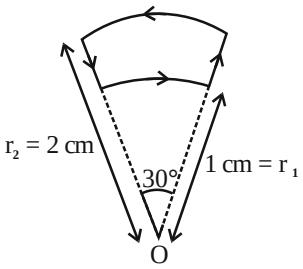
Q.28 (1)

Ammeter is a device to measure the current in the circuit. For measurement of the current it is connected in series with that element.

To convert a galvanometer in to an ammeter a shunt is added parallel to the galvanometer therefore, ammeter resistance is very less.

For an ideal ammeter resistance should be zero.

Q.29 (4)



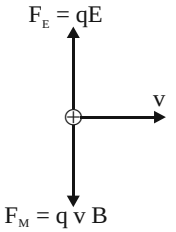
For an arc $B=\frac{\mu_0 I}{2R}\left(\frac{\theta}{2\pi}\right)$

$$B_0=\left[\frac{\mu_0 I}{2r_1}-\frac{\mu_0 I}{2r_2}\right]\frac{\theta}{2\pi}$$

$$=\left[\frac{\left(4\pi\times10^{-7}\right)\frac{1\cdot2}{\pi}}{2\times10^{-2}}-\frac{4\pi\times10^{-7}\times\frac{1\cdot2}{\pi}}{2\times2\times10^{-2}}\right]\times\frac{\pi}{6(2\pi)}$$

$$=2.4\times10^{-5}\left[1-\frac{1}{2}\right]\times\frac{1}{12}=1\,\mu T$$

Q.30 (2)

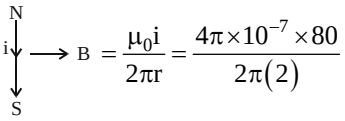


For particle's velocity to remain constant, net force on the partcile should be zero. Therefore magnetic force should be in downward direction.

For magnetic force to be in downword direction magnetic field direction should be out of the page. (Right hand thumb rule)

Q.31 (3)

$i = 80A$

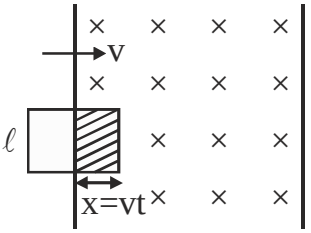


$$\rightarrow B=\frac{\mu_0 i}{2\pi r}=\frac{4\pi\times10^{-7}\times80}{2\pi(2)}$$

$= 8 \times 10^{-6}$ towards east

$= 8\mu T$ East

Q.32 (4)



When loop enters the field, flux changes as

$\phi = BA$

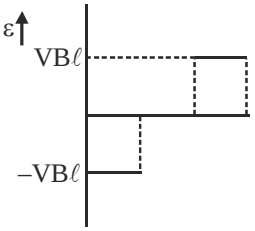
$$\phi = B\ell vt$$

Therefore, an emf is induced in the loop and the value of induced emf is

$$e=-\frac{d\phi}{dt}=-B\ell v$$

Due to induced emf anticlockwise current flows in the loop. But when the loop completely enters in to the field then flux becomes constant, therefore no emf is induced and no current flows in the loop.

When the loop comes out to the field again flux changes and emf gets induced. This time flux decreases, so the current flows in clockwise direction. The magnitude of induced emf is same as that of the initial (i.e., $|e| = VB\ell$).



Q.33 (3)

As $V_L = V_C$, so its a condition of resonance. Therefore, net potential drop across capacitor and inductor will be zero.

$\therefore$ Voltage across the terminal of a resistance

$V = 100\,V$

Displacement current $i_d = \frac{dq}{dt} = 2\pi f q_0 \cos 2\pi ft$

Q.45 (1)

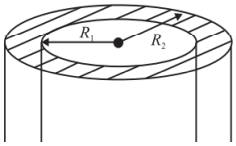
Thick ness of the wall, $t = r_2 - r_1$

$r_2 = (3.79 \pm 0.02)$ cm

$r_1 = (2.23 \pm 0.01)$ cm

$t = (3.79 - 2.23) \pm (0.02 + 0.01)$

$= (1.56 \pm 0.03)$ cm



Q.46 (2)

$n_{CO_2} = \frac{8.8}{44}$, $n_C = \frac{8.8}{44} \times 1$, $n_C = 0.2$,

$n_{H_2O} = \frac{5.4}{18}$, $n_H = \frac{5.4}{18} \times 2$ $n_H = 0.6$

C : H

0.2 : 0.6

1 : 3

So possible M.F = C_2H_6

Q.47 (2)

$E = \frac{hc}{\lambda} \times N_A$

$E = \frac{6.6 \times 10^{-34} \times 3 \times 10^8 \times 6.02 \times 10^{13}}{440 \times 10^{-9}}$

$E = 0.27\,09 \times 10^6$ J

$E = 27 \times 10^5$ J

Q.48 (2)

P-1 Possibel values of m is [$-\ell$ to $+\ell$]

$m \rightarrow$ magnetic quantum No.

$\ell \rightarrow$ Azimuthal quantum No.

in option '2' value of $\ell = 1$

So m should be – 1 to + 1

Q.49 (1)

For Balmer series transition

$n_1 = 2$

$n_2 = 3 \ldots\ldots \infty$. $n_2 \rightarrow n_1$

so correct Ans is $3 \rightarrow 2$

Option (1)

Q.50 **(3)**

Be and Al have same charge/size ratio, so they are diagonally related.

Q.51 (1)

NO (Neutral)

Al_2O_3 (Amphoteric)

Cl_2O_7 (Acidic)

Na_2O (Basic)

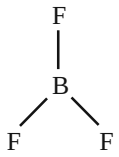
Q.52 (1)

$H_2O \rightarrow 1.85$ D

$NH_3 \rightarrow 1.47$ D

$CO_2 \rightarrow 0$ D

Q.53 (2)



Valence $e^{\ominus} = 6$

Which is less than 8

Q.54 (2)

$SF_6 \rightarrow sp^3d^2 \rightarrow$ octahedral

$CCl_4 \rightarrow sp^3 \rightarrow$ tetrahedral

$:\ddot{C}lF_3 \rightarrow sp^3d \rightarrow T - shape$

$SO_3 \rightarrow sp^2 \rightarrow$ Trigonal planar

Q.55 **(3)**

$v_1 = 10^{-3} m^3, v_2 = 10^{-2} m^3$

$P_{ext} = 10^5$ Nm^{-2}

$w = -P_{ext}(dV)$

$w = -10^5[10^{-2} - 10^{-3}]\, m^3 \times Nm^{-2}$

$w = -10^5[10 \times 10^{-3} - 10^{-3}]$ Nm

$w = -10^5 \times 9 \times 10^{-3}$ J [N.m = J]

$w = -900$ J

Q.56 **(1)**

P-1 $CH_4 + \frac{1}{2}O_2 \rightarrow CH_3OH \quad \Delta H < O$

$\Delta H = \Delta H_{comb.}(CH_4) - \Delta H_{comb}.CH_3OH$

$\Delta H = -x - (-y)$

$\Delta H = y - x$

$\Delta H < 0 \Rightarrow y - x < 0$

$x > y$

Q.57 (3)

$\Delta U = nC_v\Delta T$

& isothermal process so

$\Delta T = 0$

$\Delta U = 0$

Q.58 (2)

$H_2O + CO \rightleftharpoons H_2 + CO_2$

1	1	–	–
1– x	1–x	x	x

$K_{eq.}^{m} = \frac{[H_2][CO_2]}{[H_2O][CO]}$

$K_{eq.}^{m} = \left(\frac{x}{1-x}\right)^2$

$K_{eq.}^{m} = \left(\frac{0.4}{0.6}\right)^2$

$K_{eq.}^{m} = 0.4356 \approx 0.44$

Q.59 **(1)**

$N_2O_{4(g)} \rightleftharpoons 2NO_{2(g)}$

t = 0 1 mole –

$t = q^m$ 1-x 2x

total moles at $eq^m = 1 + x$

$$k_p = \frac{\left(p_{NO_2}\right)^2}{\left(p_{N_2O_4}\right)}$$

$$k_p = \frac{\left(\frac{2x}{1+x}\times p\right)^2}{\left(\frac{1-x}{1+x}\times p\right)}$$

$$k_p = \frac{4x^2p}{1-x^2}$$

$$\alpha = \frac{\text{dissociated moles}}{\text{initial moles}} = \frac{x}{1}$$

$$k_p = \frac{4\alpha^2p}{1-\alpha^2}$$

Q.60 **(1)**

$$AB_2 \rightleftharpoons A^{+2} + 2B^-$$

1 – –

1-s s 2s

$k_{sp} = [A^{+2}][B^-]^2$

$k_{sp} = S \times (2S)^2$

$k_{sp} = 4s^3 = 4 \times 10^{-9}$

$S = (10^{-9})^{1/3}$

$S = 10^{-3}$ M

Option (3)

Q.61 (2)

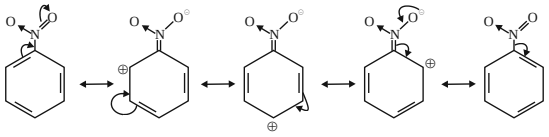
$H\underline{N}O_3 \Rightarrow 1 + x - 6 = 0 \Rightarrow x = +5$

$\underline{N}_3H \Rightarrow 3x + 1 = 0 \Rightarrow x = -\frac{1}{3}$

$\underline{N}H_3 \Rightarrow x + 3 = 0 \Rightarrow x = -3$

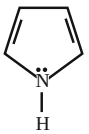
option (2)

Q.62 (4)



No. of R.S. = 5

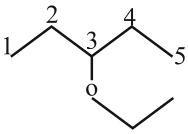
Q.63 **(1)**



Aromatic, Heterocyclic

Cyclic, complete delocalisation and Pyrrole has 6 $\pi e^{\ominus}$

Q.64 **(2)**

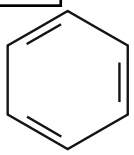


3-ethoxy pentane

Q.65 **(3)**

$$CaC_2 \xrightarrow{H_2O} H-C\equiv C-H \xrightarrow[\text{Fe-tube}]{\text{Red Hot}}$$

ethyne



cyclic polymerisation

Q.66 (3)

$$CH_3-CH=CH_2 \xrightarrow[\text{Peroxide}]{H\ I} CH_3-\underset{I}{CH}-\underset{H}{CH_2}\ \{EAR\ mech\}$$

{M.k - Rule addition }

If HI reacts via FRAR mech then

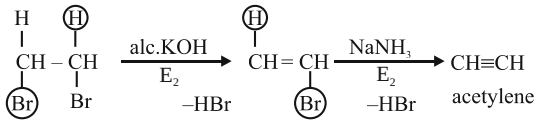
$CH_3-CH=CH_2 \xrightarrow{I^\circ}$ No reaction

but $I^\circ + I^\circ \rightarrow I_2$

Q.67 **(2)**

(1) $\underset{Br}{\overset{|}{CH_2}}-\underset{Br}{\overset{|}{CH_2}} \xrightarrow{Zn/\Delta} CH_2=CH_2 + Zn\,Br_2$

ethylene

(2) 

Q.68 (2)

$\pi = i\,cRT$

$i = 3$

$$\pi = 3\times\frac{20}{164}\times\frac{1000}{100}\times 0.0821\times 273$$

$\pi = 81.99$ atm ≈ 82 atm

Q.69 (2)

$X_{urea} = 0.08$

$X_{H2O} = 0.92$

$$m = \frac{\text{mole of solute}}{\text{wt of solvent(kg)}}$$

$$m = \frac{0.08}{0.92\times 18}\times 1000$$

$$m = \frac{80}{16.56} = 4.8m$$

Q.70 (2)

$K = 5\times10^{-5}\ s\ cm^{-1}$

$\alpha = ?$

$$\lambda_m = \frac{\kappa \times 1000}{m} = \frac{5 \times 10^{-5} \times 1000}{10^{-3}}$$

$$\lambda_m = 50$$

$$\alpha = \frac{\lambda_m}{\lambda_m^0} = \frac{50}{400} = \frac{1}{8}$$

$\alpha = 0.125$

option (2)

Q.71 (1)

Cathode $Cu^{+2} + 2e^- \rightarrow Cu$

$$\text{Anode} : 4OH^- \rightarrow O_2 + 2H_2O + 4e^-$$

$$\frac{v}{22.4} \times 4 = \frac{1 \times 9.65 \times 60}{96500}$$

$$v = \frac{9.65 \times 60 \times 22.4}{4 \times 96500} \times 1000$$

v=33.6 ml

Q.72 (3)

$nA \rightarrow B + C$

0^{th} order, $t_{1/2} = \frac{[A]_0}{2k}$ .....(ii)

1^{st} order, $t_{1/2} = \frac{\ln 2}{k}$ ....(i)

II^{nd} order, $t_{1/2} = \frac{1}{k[A]_0}$ ....(iii)

Q.73 (4)

$$\ell nk = \ell n A - \frac{E_a}{RT}$$

$$\text{slope} = -\frac{Ea}{R}$$

Q.74 (2)

$k = 2.303 \times 10^{-2}\ S^{-1}$

I^{st} order reaction

$$t_{90\%} = \frac{2.303}{k} \log \frac{100}{100-90}$$

$$t_{90\%} = \frac{2.303}{2.303 \times 10^{-2}} \log \frac{100}{10}$$

$t_{90\%} = 100$ sec.

Q.75 (4)

B.P. order $\rightarrow H_2O > H_2Te > H_2Se > H_2S$

H_2O has exceptionally high B.P. due to intermolecular H-bonding.

Q.76 (3)

'Xe' valency $\rightarrow$ 2, 4, 6, 8

Q.77 (4)

I^{st} I.P. $\rightarrow$

Zn > Fe > Co > Ni

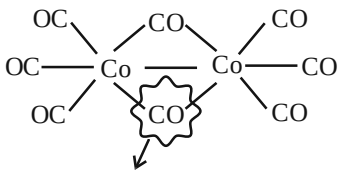
$\downarrow$

$4s^2 3d^{10}$ (Full filled-orbital)

Q.78 (1)

$$2MnO_2 \xrightarrow[KNO_3]{4KOH} 2K_2MnO_4 + 2H_2O$$

Q.79 **(4)**



2-bridge CO groups

Q.80 (1)

$[Cr(NH_3)_4Cl_2]Cl \rightarrow 1:1$ eletrolyte

$K_2[Fe(C_2O_4)_3] \rightarrow 2:1$ eletrolyte

$[Co(NH_3)_5Cl]Cl_2 \rightarrow 1:2$ eletrolyte

$[Cr(NH_3)_5Cl]Cl_3 \rightarrow 1:3$ eletrolyte

Q.81 (2)

$$R - X + AgF \xrightarrow{\text{water}} \underset{\{C-F\}}{R - F} + AgX \downarrow$$

No C – C bond formation take place.

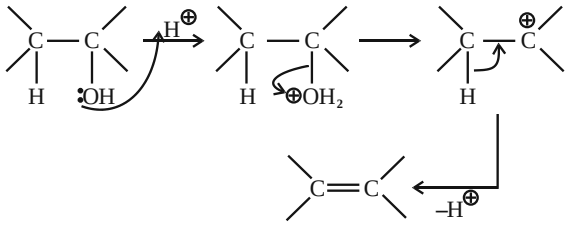
Q.82 **(4)**

1° - Alcohol $\xrightarrow{Cu/\Delta}$ Aledehyde

2° - Alcohol $\xrightarrow{Cu/\Delta}$ Ketone

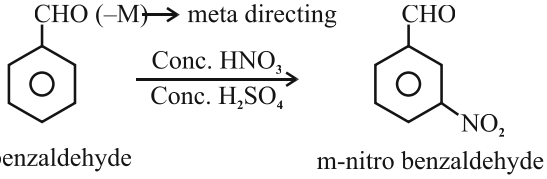
3° - Alcohol $\xrightarrow{Cu/\Delta}$ alkene

Q.83 **(1)**



$C^{\oplus}$ is formed as intermediate

Q.84 (2)



benzaldehyde m-nitro benzaldehyde

– M $\rightarrow$ deactivating groups

Q.85 (1)

(a) HCHO is a gas at RT.

(b) $\underset{(\text{H–bonding})}{\text{R–OH}} > \text{R–X}\{\text{BP}\}$

(c) $CH_2 = CH - CH_2 - X \quad \underset{\text{single bond}}{\{C-X\}}$

Q.86 (2)

$CH_3-\underset{\underset{O}{\|}}{C}-OH$ NOT show haloform reaction –OH is better leaving group than $-CX_3$

Q.87 (2)

Boiling point α H- bonding

For isomeric BP $\rightarrow 1^o > 2^o > 3^o$ - amines

Q.88 (4)

$$CH_3-\underset{\underset{O}{\|}}{C}-NH_2 + NaOH + Br_2 \rightarrow CH_3-NH_2$$

Acetamide — Methanamine

Hoffmann – Bromamide Degradation reaction.

Q. 89 (1)

Deficiency of vitamine 'A' cases Xerophthalmia

Q.90 **(2)**

$$\underset{\text{green}}{FeSO_4} + \underset{\text{ammonium}}{(NH_4)_2SO_4} + 6H_2O \rightarrow \underset{(\text{Mohr's salt})}{FeSO_4\cdot(NH_4)_2SO_4\cdot 6H_2O}$$

sulphate

Q.91 (2)

Q.92 (1)

Q.93 (3)

Q.94 (3)

Brown algae have cell wall made up cellulose which is usually covered on the outside by gelatinous coating of algin.

Algin has good water holding capacity.

Q.95 (3)

Q.96 (2)

Q.97 (1)

The filaments of stamens within a flower may vary in length as in Salvia and Mustard.

In monocotyledonous seed such as maize, the seed coat is membranous and generally fused with the fruit wall.

Q.98 (2)

Q.99 (2)

Q.100 (1)

New NCERT Pg. No. 76

Starch sheath: Refers to the endodermis in dicot stems, characterized by the storage of starch.

Q.101 (1)

New NCERT Pg. No. 76, 77

- Lesser number of stomata on abaxial surface (i): Incorrect, as dicot leaves generally have more stomata on the abaxial surface (underside).
- Mesophyll differentiation (ii), variability in vein thickness (iii), and bundle sheath surrounding vascular bundle (iv): All correct.

Q.102 (3)

New NCERT Pg. No. 77

- **Assertion:** Correct, as the size of vascular bundles in a dicot leaf depends on the size of the veins.
- **Reason:** Incorrect, as in a dorsiventral leaf, vascular bundles are surrounded by thick walled bundle sheath, which varies with vein size.

Q.103 (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.104 (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.105 (4)

Q.106 (1)

Q.107 (2)

Q.108 (2)

Q.109 (3)

Q.110 (3)

Q.111 (4)

Q.112 (1)

Q.113 (1)

Q.114 (3)

Pyruvate enters mitochondrial matrix undergoes oxidative decarboxylation by a complex set of reactions catalyse by pyruvate dehydrogenase.

Q.115 **(2)**

Q.116 (3)

Q.117 (1)

Q.118 (4)

Q.119 (1)

NEW NCERT Pg. No - 19, 20

At its lower end the embryonal axis root cap enclosed in an undifferentiated sheath called coleorhiza.

Q.120 (4)

Q.121 (2)

NEW NCERT Pg. No -7

The generative cell is small and floats in the cytoplasm of the vegetative cell.

It is spindle shaped with dense cytoplasm and a nucleus.

Pollen grain exine has prominent apertures called germ pores, where sporopollenin is absent.

Q.122 (2)

Q.123 (1)

Q.124 (3)

Q.125 (1)

Q.126 (2)

Q.127 (3)

Q.128 (2)

Q.129 (3)

NEW NCERT Pg. No -151, 152

Wine and beer are produced without distillation whereas brandy, whisky and rum are produced by distillation of the fermented broth.

Q.130 (4)

NEW NCERT Pg. No. - 182

As a first step towards gene therapy, lymphocytes from the blood of the patient are grown in a culture outside the body. A functional ADA cDNA (using a retroviral vector) is then introduced into these lymphocytes, which are subsequently returned to the patient.

Q.131 (2)

NEW NCERT Pg. No. - 170

Selection of recombinants due to inactivation of antibiotics is a cumbersome procedure because it requires simultaneous plating two plates having different antibiotics.

Selectable markers have been developed which differentiate recombinants from non-recombinants on the basis of their ability to produce colour in the presence of a chromogenic substrate.

Q.132 (3)
NEW NCERT Pg. No. - 169

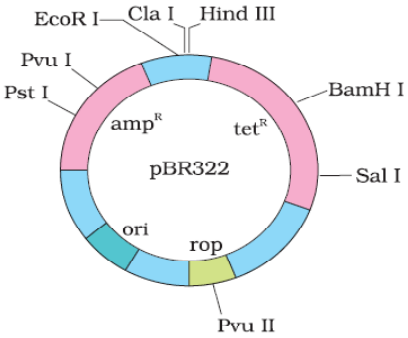


Figure 9.4 *E. coli* cloning vector pBR322 showing restriction sites (*Hind* III, *Eco*R I, *Bam*H I, *Sal* I, *Pvu* II, *Pst* I, *Cla* I), ori and antibiotic resistance genes (amp^R and tet^R). rop codes for the proteins involved in the replication of the plasmid.

Q.133 (2)
NEW NCERT Pg. No. - 183

Normal physiology and development: Transgenic animals can be specifically designed to allow the study of how genes are regulated, and how they affect the normal functions of the body and its development, e.g., study of complex factors involved in growth

Study of disease: Many transgenic animals are designed to increase our understanding of how genes contribute to the development of disease. These are specially made to serve as models for human

Biological products: Medicines required to treat certain human diseases can contain biological products, but such products are often expensive to make. Transgenic animals that produce useful

Vaccine safety: Transgenic mice are being developed for use in testing the safety of vaccines before thev are used on humans,

Chemical safety testing: This is known as toxicity/ safety testings The procedure is the same as that used for testing toxicity of drugs.

Q.134 (1)

Q135 (4)

Q.136 (2)
NEW NCERT Pg. No. - 207

Detritivores (e.g., earthworm) break down detritus into smaller particles. This process is called fragmentation. By the process of leaching, water-soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts. Bacterial and fungal enzymes degrade detritus into simpler inorganic substances. This process is called as catabolism.

Q.137 (1)
NEW NCERT Pg. No. - 207

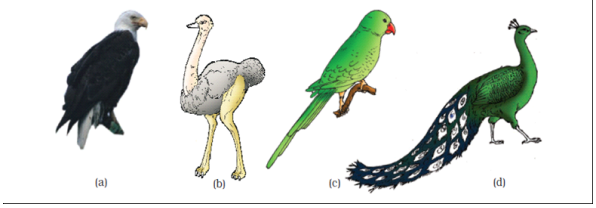
Primary production is defined as the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis. It is expressed in terms of weight (gm^{-2}) or energy (kcal m^{-2}). The rate of biomass production is called productivity. It is expressed in terms of gm^{-2} yr-1 or (kcal n^{-2}) yr^{-1} to compare the

Q.138 (2)

Q.139 (4)

Q.140 (3)
NEW NCERT Pg. No. - 50

Here the birds sequence are as follow :- Neophron , Struthio , psittacula , pavo



Q.141 (4)
NEW NCERT Pg. No. - 46

carcharodon is the organism where notochord is not present in larval tail

Q.142 (2)
NEW NCERT Pg. No. - 42

Here hookers and suckers are there in the body of taenia , to directly absorb the nutrients to carry out parasitic adaptations .

Q.143 (2)
NEW NCERT Pg. No. - 44

Here the arthropoda correctly matches with housefly , butterfly , scorpion and silkworm (insects)

Q.144 (2)

Q.145 (3)

Q.146 (2)

New NCERT Pg. No. 82, 83

• The excretory system consists of a pair of kidneys, ureters, cloaca and urinary bladder.

• Kidneys are compact, dark red and bean-like structures situated a little posteriorly in the body cavity on both sides of vertebral column.

• Each kidney is composed of several structural and functional units called uriniferous tubules or nephrons.

• Two ureters emerge from the kidneys in the male frogs. The ureters act as urinogenital duct which opens into the cloaca.

Q.147 (3)

NCERT Page No. 93

> The ratio or protein and lipid varies considerably in different cell types. In human beings, the membrane of the erythrocyte has approximately 52 per cent protein and 40 per cent lipids.

Cell membrane poses 40% lipids and 52% protein in human erythrocytes. It also possess carbohydrates in some amount.

Q.148 (1)

Q.149 (2)

Q.150 (2)

Q.151 (1)

NEW NCERT Pg. No. - 189

Each haemoglobin molecule can carry a maximum of four molecules of O_2.

Q.152 (2)

NEW NCERT Pg. No. - 190

a. Asthma (i) Occupational Respiratory Disorders

b. Emphysema (ii) Inflammation of bronchi and bronchioles

c. Fibrosis of lungs (iii) Decreased respiratory surface area

Q.153 (2)

NEW NCERT Pg. No -201

The T-wave represents the return of the ventricles from excited to normal state (repolarisation). The end of the T-wave marks the end of systole.

Q.154 (4)

NEW NCERT Pg. No -194 , 196

Fibrinogens are needed for clotting or coagulation of blood.

Fibrins are formed by the conversion of inactive fibrinogens in the plasma by the enzyme thrombin. Thrombins, in turn are formed from another inactive substance present in the plasma called prothrombin. An enzyme complex, thrombokinase, is required for the above reaction.

Q.155 (4)

NEW NCERT Pg. No. - 208 , 213

On an average, 1100-1200 ml of blood is filtered by the kidneys per minute which constitute roughly 1/5th of the blood pumped out by each ventricle of the heart in a minute.

The urine formed is a light yellow coloured watery fluid which is slightly acidic (pH-6.0) and has a characteristic odour.

On an average, 25-30 gm of urea is excreted out per day

Q.156 (3)

NEW NCERT Pg. No. - 209

Distal Convoluted Tubule (DCT): Conditional reabsorption of Na^+ and water takes place in this segment. DCT is also capable of reabsorption of HCO_3^- and selective secretion of hydrogen and potassium ions and NH_3 to maintain the pH and sodium-potassium balance in blood.

Q.157 (3)

Q.158 (1)

Q.159 (4)

NEW NCERT PAGE NO - 236

Hypothalamus lies at the base of the thalamus. The dorsal portion of the midbrain consists mainly of four round swellings (lobes) called corpora quadrigemina. Cerebellum has very convoluted surface in order to provide the additional space for many more neurons.

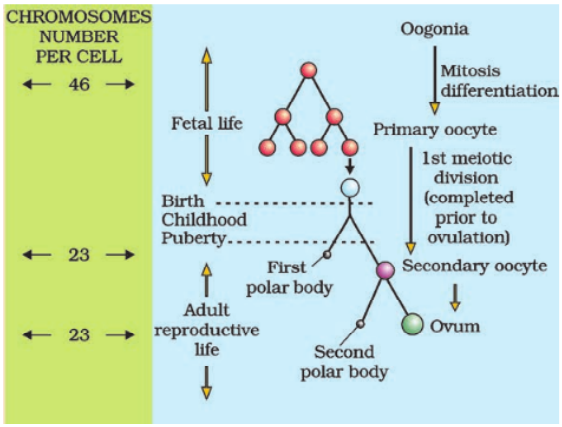
Q.160 (2)

NEW NCERT Pg. No -248

Hormones which interact with membrane-bound receptors normally do not enter the target cell, but generate second messengers (e.g., cyclic AMP, IP_3, Ca^{++} etc) which in turn regulate cellular metabolism

Q.161 (2)

NEW NCERT Pg. No - 32, 33 & 36



The second meiotic division is also unequal and results in the formation of a second polar body and a haploid ovum (ootid).

Q.162 (2)
NEW NCERT Pg. No - 30

The uterus opens into vagina through a narrow cervix. The wall of the uterus has three layers of tissue. The external thin membranous perimetrium, middle thick layers of smooth muscle, myometrium and inner glandular layer called endometrium that lines the uterine cavity. The endometrium undergoes cyclical changes during menstrual cycle while the myometrium exhibits strong contractions during delivery of the baby

Q.163 (4)
NEW NCERT Pg. No - 34, 35

Both LH and FSH attain a peak level in the in middle of cycle (about 14th day). Rapid secretion of LH leading to its maximum level during the mid- cycle called the LH surge induces rupture of graffian follicle and thereby the release of ovum (ovulation).

Q.164 (3)
NEW NCERT Pg. No - 38

The first movements of the foetus and appearance of hair on the head are usually observed during the fifth month.

Q.165 (2)
NEW NCERT Pg. No - 27

The vasa efferentia leave the testis and open into epididymis located along the posterior surface of each testis.

Q.166 (1)
NEW NCERT Pg. No - 27

Each seminiferous tubule is lined on its inside by two types of cells called male germ cells and sertoli cells. The male germ cells undergo meiotic division finally leading to sperm formation, while sertoli cells provide nutrition to the germ cells. The regions outside the seminiferous tubule called interstitial spaces contain small blood vessels and interstitial cells or leydig's cells.

Q.167 (1)
NEW NCERT Pg. No. -48

In Zygote Intrafallopian Transfer (ZIFT), zygotes (early embryos with up to 8 blastomeres) are transferred into the fallopian tube, facilitating further development naturally.

Q.168 (1)
NEW NCERT Pg. No. -48

Intra cytoplasmic sperm injection (ICSI) is another specialised procedure to form an embryo in the laboratory in which a sperm is directly injected into the ovum. Infertility cases either due to inability of the male partner to inseminate the female or due to very low sperm counts in the ejaculates, could be corrected by artificial insemination (AI) technique.
In this technique, the semen collected either from the husband or a healthy donor is artificially introduced either into the vagina or into the uterus (IUI - intra-uterine insemination) of the female.

Q.169 (3)

Q.170 (1)

Q.171 (2)
NEW NCERT Pg. No. -95

George Gamow proposed that a genetic code is formed by a specific combination of nucleotide bases. This paved the way for the triplet codon hypothesis. A single codon coding for multiple amino acids (option 1) contradicts the specificity of the genetic code. Codons are read in a contiguous, non-overlapping fashion (option 3), and DNA contains the information for amino acid sequences (option 4), but these are not Gamow's specific contributions.

Q.172 (3)

Q.173 (4)
NEW NCERT Pg. No -125

The Neanderthal man with a brain size of 1400 cc lived in near east and central Asia between 1,00,000-40,000 years back. They used hides to protect their body and buried their dead.

Q.174 (2)

Q.175 (3)

Rhino viruses cause common cold. They infect the nose and respiratory passage but not the lungs.

Q.176 (2)

NEW NCERT Pg. No -142

Opioids are the drugs, which bind to specific opioid receptors present in our central nervous system and gastrointestinal tract. Heroin commonly called smack is chemically diacetylmorphine which is a white, odourless, bitter crystalline compound. This is obtained by acetylation of morphine.

Q.177 (3)

NEW NCERT Pg. No -137

The use of drugs like anti-histamine, adrenalin and steroids quickly reduce the symptoms of allergy.

Q.178 (3)

Q.179 (1)

Q.180 (2)