ANSWER KEY
FULL TEST-07

PHYSICS

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

CHEMISTRY

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

BIOLOGY

Q.91 (3)	**Q.92** (4)	**Q.93** (3)	**Q.94** (1)	**Q.95** (3)	**Q.96** (1)	**Q.97** (3)	**Q.98** (3)	**Q.99** (1)	**Q.100** (2)
Q.101 (2)	**Q.102** (4)	**Q.103** (4)	**Q.104** (1)	**Q.105 (3)**	**Q.106** (2)	**Q.107** (3)	**Q.108** (4)	**Q.109** (1)	**Q.110** (4)
Q.111 (3)	**Q.112** (1)	**Q.113** (4)	**Q.114** (2)	**Q.115** (4)	**Q.116** (2)	**Q.117** (3)	**Q.118** (2)	**Q.119** (3)	**Q.120** (1)
Q.121 (1)	**Q.122** (2)	**Q.123** (4)	**Q.124** (3)	**Q.125** (4)	**Q.126** (3)	**Q.127** (2)	**Q.128** (1)	**Q.129** (4)	**Q.130** (1)
Q.131 (4)	**Q.132** (1)	**Q.133** (2)	**Q.134** (2)	**Q.135** (3)	**Q.136 (1)**	**Q.137 (3)**	**Q.138** (3)	**Q.139** (3)	**Q.140** (1)
Q.141 (1)	**Q.142** (4)	**Q.143** (4)	**Q.144** (4)	**Q.145** (3)	**Q.146** (3)	**Q.147** (1)	**Q.148** (2)	**Q.149** (4)	**Q.150** (2)
Q.151 (1)	**Q.152** (2)	**Q.153** (1)	**Q.154** (4)	**Q.155** (1)	**Q.156** (1)	**Q.157** (1)	**Q.158 (4)**	**Q.159 (1)**	**Q.160** (2)
Q.161 (4)	**Q.162** (4)	**Q.163** (3)	**Q.164** (2)	**Q.165 (4)**	**Q.166** (2)	**Q.167** (1)	**Q.168** (3)	**Q.169** (2)	**Q.170** (1)
Q.171 (4)	**Q.172** (2)	**Q.173** (1)	**Q.174** (3)	**Q.175 (4)**	**Q.176 (1)**	**Q.177 (3)**	**Q.178** (2)	**Q.179** (4)	**Q.180** (3)

Hints & Solutions

Q.1 **(3)**

$E = k\,(m)^x(n)^y\,(A)^z$

$[M^1L^2T^{-2}] = k\,[M^1]^x\,[T^{-1}]^y\,[L^1]^z$

$M^1L^2T^{-2} = k[M^xT^{-y}\,L^{+z}]$

$x = 1, y = 2, z = +2$

$2x + y + z = 2(1) + 2 + 2 = 6$

Q.2 (2)

$$a_{AB} = -\frac{30}{20} = -1.5\ m/s^2$$

$a_{BC} = 0\ m/s^2$

$$a_{CD} = \frac{60}{50-30} = \frac{60}{20} = 3\ m/s^2$$

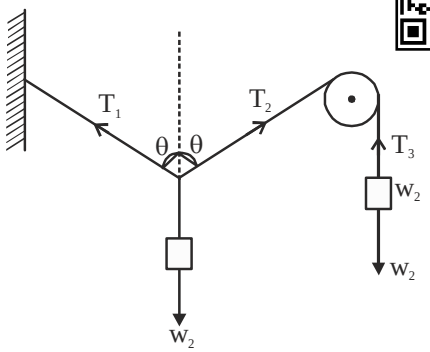
$$a_{DE} = \frac{0-30}{60-50} = 3\ m/s^2$$

$a_{EF} = 0\ m/s^2$

$$a_{FG} = \frac{40-0}{90-70} = 2\ m/s^2$$

hence, maximum positive acceleration is in region *CD*.

Q.3 (3)



$T_1 \sin\theta = T_2 \sin\theta$

$\therefore\ T_1 = T_2$ .....(1)

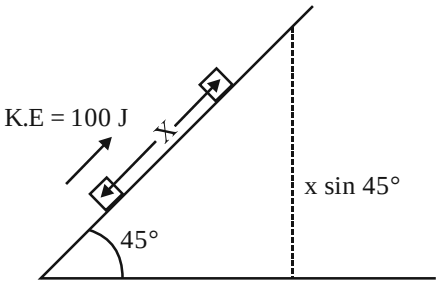
$T_2 = T_3$ .....(2)

$T_3 = w_3$ .....(3)

from equation (1), (2) and (3)

$T_1 = T_2 = T_3$

Q.4 (1)



work done by all forces = change in its kinetic energy

$W_{mg} + W_f = kE_f - kE_i$

$-mg\,x\sin 45^\circ - (\mu mg\cos 45^\circ)x = 0 - 100$

$$\left(5\times10\times\frac{1}{\sqrt{2}}\right)x + \left(\frac{1}{2}\times5\times10\times\frac{1}{\sqrt{2}}\right)x = 100$$

$$x\left(\frac{75}{\sqrt{2}}\right) = 100$$

$$x = \frac{100\sqrt{2}}{75} = \frac{4\sqrt{2}}{3}\,m$$

Q.5 (1)

$$F = \frac{dU}{dx} = \begin{pmatrix}\text{solpe of}\\ U - x\text{ curve}\end{pmatrix}$$

for equilibrium

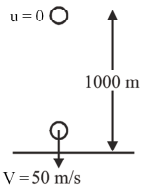
$F_{net} = 0$

at $x = x_1$

slope is zero

$\therefore\ F = 0$

Q.6 (3)



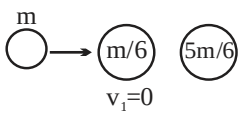
$$(W.D)_G = mgh = \frac{1\times10}{1000}\times1000 = 10\,J$$

$$(W.D)_G + (W.D)_R = K_f - K_i$$

$$10 + (W.D)_R = \frac{1}{2}\times\frac{1\times}{1000}(50)^2$$

$$(W.D)_R = 1.25 - 10 = -8.75$$

Q.7 **(1)**

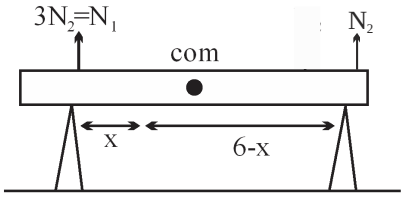


No external force on the mass, so the linear momentum will remain conserve.

$$\therefore mv = \frac{m}{6}(0) + \left(\frac{5m}{6}\right)v'$$

$$v' = \frac{6v}{5}$$

Q.8 (3)



$N_1 x = N_2(6-x)$ (balancing torque)

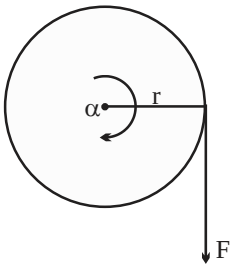
$3N_2 x = N_2(6-x)$

$4x = 6$

$$x = \frac{6}{4} = \frac{3}{2} = 1.5\,m$$

$\therefore$ COM of plank is 1.5 m from knife 1 and 4.5(6 – 1.5 = 4.5 m) from the knife 2.

Q.9 (1)



$$I = \frac{mR^2}{2}$$

$$= \frac{(1)(1)^2}{2}$$

$= 0.5\ kg\,m^2$

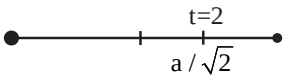
Torque $= I\alpha$

$Fr = I\alpha \qquad \left(\vec{\tau} = \vec{r}\times\vec{F}\right)$

$F(1) = (0.5)(1)$

$$F = \frac{1}{2}N$$

Q.10 (4)



$$x = A\sin\left(\frac{\pi}{8}t + \phi\right)$$

at $t = 2sec \Rightarrow x = 0$

$$0 = A\sin\left(\frac{\pi}{4} + \phi\right) \Rightarrow \phi = -\left(\frac{\pi}{4}\right)$$

$$x = A\sin\left(\frac{\pi}{8}t - \frac{\pi}{4}\right)$$

differentiate wrt time

$$v = A\frac{\pi}{8}\cos\left[\frac{\pi}{8}t - \frac{\pi}{4}\right]$$

at t = 4 sec v =4m/s

$$4 = A\frac{\pi}{8}\cos\left[\frac{\pi}{2} - \frac{\pi}{4}\right]$$

$$4 = \frac{A\pi}{8}\times\frac{1}{\sqrt{2}} \Rightarrow A = \frac{32\sqrt{2}}{\pi}$$

Q.11 (4)

$$n = \frac{v}{2L} = \frac{1}{2L}\sqrt{\frac{T}{\mu}} = \frac{1}{2L}\sqrt{\frac{T}{\pi r^2\rho}}$$

$$\therefore n \propto \sqrt{\frac{T}{r^2}} \left(\text{for constant L and } \rho\right)$$

$$\therefore \frac{n}{n} = \sqrt{\frac{r^2}{T}\times\frac{(T/2)}{(2r)^2}} = \sqrt{\frac{1}{8}}$$

$$\Rightarrow n = \frac{n}{2\sqrt{2}}$$

Q.12 **(4)**

Heat released by water,
$Q = ms\Delta T$
$= (4)(1)(80 - 60) = 80$ cal
Heat absorbed by the copper
$Q = 80$ cal
$ms_{Cu}\Delta T = 80$
$(20)S_{Cu}(60 - 20) = 80$

$$S_{Cu} = \frac{80}{20\times 40} = 0.1$$ **Ans. (4)**

Q.13 (2)

Q.14 (2)

Magnetic moment of loop

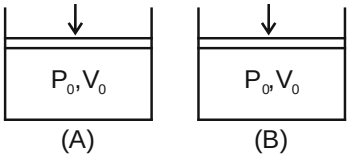
$$\mu = NIA = 100\times\frac{1}{2}\times\pi r^2$$

(Potential Energy) $U = -\vec{\mu}\cdot\vec{B}$

$$\Delta U = U_f - U_i = -(-\mu B) - (-\mu B) = 2\mu B = 2\times 100\times\frac{1}{2}\times\pi$$

$$\left(\frac{1}{10}\right)^2\times 2 = 2\pi J$$

Q.15 **(1)**



(A) Isothermal compression :

$$P_f V_f = P_i V_i$$

$$P_f\left(\frac{V_0}{2}\right) = P_0 V_0$$

$$(P_f)_A = 2P_0 \quad \ldots.(1)$$

(B) Adiabatic compression :

$$P_f V_f^{\gamma} = P_i V_i^{\gamma}$$

$$\Rightarrow \quad (P_f)_B\left(\frac{V_0}{2}\right)^{\gamma} = P_0 V_0^{\gamma}$$

$$(P_f)_B = P_0\left(2^{\gamma}\right) \quad \ldots(2)$$

From equation (1) and (2)

$$\frac{(P_f)_B}{(P_f)_A} = \frac{2^{\gamma}}{2} = 2^{\gamma-1}$$

Q.16 (1)

$$\Delta L = \frac{FL}{AY} = \frac{4mgL}{\pi d^2 y}$$

$$\Delta L = \frac{4\times 400\times 2}{\pi(4\times 10^{-3})^2\times 2\times 10^{11}} = 0.31\times 10^{-3} = 0.31\text{ mm}$$

Q.17 (3)

Average energy density of electric field

$$\frac{1}{2}\varepsilon_0 E_{rms}^2$$

$$\frac{1}{2}\varepsilon_0\left[\frac{E_0}{\sqrt{2}}\right]^2 = \frac{1}{4}\varepsilon_0 E_0^2 = \frac{1}{4}\times 8.8\times 10^{-12}\times 4^2$$

$= 35.2\times 10^{-12}$ J/m^3

Q.18 (3)

From equation of continuity

$$A_1 v_1 = A_2 v_2$$

$$\pi r_1^2 v_1 = (\pi r_2^2) N_2 v_2$$

$$\Rightarrow v_2 = \left(\frac{r_1^2}{N_2 r_2^2}\right) v_1 = 8\text{m/s}$$

From Bernoullis theorem

$$P_1 + \frac{1}{2}\rho v_1^2 = P_2 + \frac{1}{2}\rho v_2^2$$

$$\Rightarrow P_2 = P_1 + \frac{1}{2}\rho(v_1^2 - v_2^2)$$

$$= (2\times 10^4) + \frac{1}{2}\times 10^3[(10)^2 - (8)^2] = 3.8\times 10^4\text{ N/m}^2$$

Q.19 (1)

Water is flowing through a horizontal cylindrical pipe of radius 8 cm. At one end of the pipe speed of water is 10 m/s and pressure is 2×10^4 N/m^2. The other end of the pipe has 20 fine holes each of radius 2 cm. The pressure of water at each hole is

$W = S \times 8\pi R^2$

$= 4.8 \times 10^{-2} \times 8 \times 3.14 \times (4 \times 10^{-2})^2$

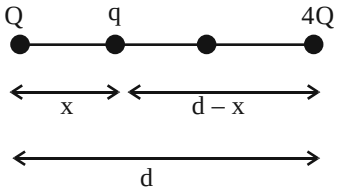
$= 1929.216 \times 10^{-6}$ J

$= 19.29 \times 10^{-4}$ J

Q.20 (2)

Potential energy of a moelcule inside the liquid is less as compare to the molecule on the surface of the liquid.

Q.21 (1)



For charge q to be at rest $E_{net} = 0$

$E_Q + E_{4Q} = 0$

$$\frac{kQ}{x^2} - \frac{K(4Q)}{(d-x)^2} = 0$$

$$\frac{1}{x} = \frac{2}{d-x}$$

$$3x = d \Rightarrow x = \frac{d}{3}$$

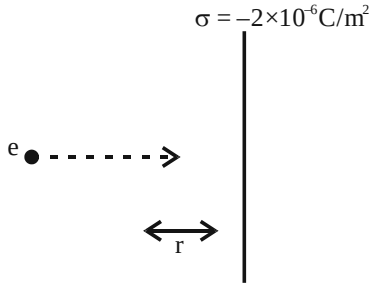
For charge Q to be in equilibrium $F_{net} = 0$

$$\frac{kQ(4Q)}{d^2} + \frac{kqQ}{(d/3)^2} = 0$$

$$\frac{9kQ}{d^2} = -\frac{4kQ^2}{d^2}$$

$$q = -\frac{4Q}{9}$$ **Ans. (1)**

Q.22 **(2)**



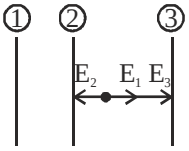
Δ K.E = P.E = Change in potential enersy

$$100eV = \left(\frac{\sigma}{\varepsilon_o}\right) qr \qquad (q = e)$$

$$r = \frac{\varepsilon_o \times 100 \times 1.6 \times 10^{-19}}{2 \times 10^{-6} \times 1.6 \times 10^{-19}}$$

$$= \frac{8.85 \times 10^{-12} \times 100}{2 \times 10^{-6}} = 0.44\text{mm}$$

Q.23 (3)



$$E_P = \vec{E}_1 + \vec{E}_2 + \vec{E}_3$$

$$= \frac{\sigma}{2\varepsilon_0}\hat{i} + \frac{2\sigma}{2\varepsilon_0}(-\hat{i}) + \frac{4\sigma}{2\varepsilon_0}(\hat{i}) = \frac{3\sigma}{2\varepsilon_0}\hat{i}$$ **Ans (3)**

Q.24 (4)

Charge density , $\sigma \propto \frac{1}{R}$

$\therefore$ At sharp corners R is less $\therefore$ $\sigma \uparrow$

$\therefore$ Assertion is wrong

Inside conductor $\Rightarrow$ E = 0

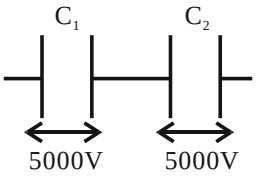
$\therefore$ Both assertion and reason are false

Q.25 (4)

Electromagentic waves are transverse wave. It can travel in vacum due to oscillating electric and magnetic field.

EM waves are produced by accelerating charge particle, not by particle moving with uniform velocity

Q.26 **(2)**



$$\frac{1}{C_{eq}} = \frac{1}{C_1} + \frac{1}{C_2}$$

$$C_{eq} = \frac{C_1 C_2}{C_1 + C_2}$$

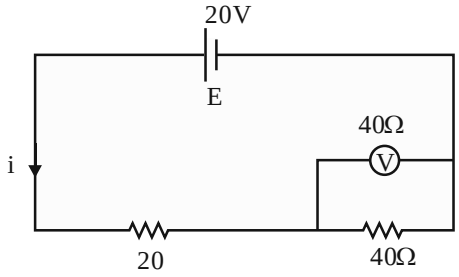
$$= \frac{(2\mu F)(2\mu F)}{(2\mu F) + (2\mu F)} = 1\mu F = 10^{-6} F$$

Equivalent capacitance = 10^{-6} F

Break down potential of the combined = 5000 + 5000

= 100000 V

Q.27 **(1)**



Equivalent resistance

$$R_{eq} = \left(\frac{40\times 40}{40+40}\right) + 20 = 20 + 20 = 40\Omega$$

Current , $i = \frac{20}{40} = 0.5A$

Current through $40\Omega = \frac{0.5}{2} = 0.25A$

$\therefore$ Reading of voltmeter $= (0.25)\times 40 = 10V$

Q.28 (2)

For the given sitution

$$\frac{5}{\ell_1} = \frac{R}{100-\ell_1} \quad \text{...(1)}$$

When the resistance is shunted with an equal resistance.

$$\frac{5}{1.6\ell_1} = \frac{\left(\frac{R}{2}\right)}{100-1.6\ell_1} \quad \text{...(2)}$$

Dividing equation (1) and (2)

$$1.6 = \frac{(100-1.6\ell_1)^2\times 2}{(100-\ell_1)}$$

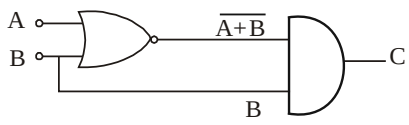
$$160 - 1.6\,\ell_1 = 200 - 3.2\,\ell_1$$

$$1.6\,\ell_1 = 40 \Rightarrow \ell_1 = \frac{400}{16} = \frac{100}{4} = 25\text{cm}$$

From equation (1)

$$R = \frac{(100-25)\times 5}{25} = 15\Omega$$ **Ans. (2)**

Q.29 (4)



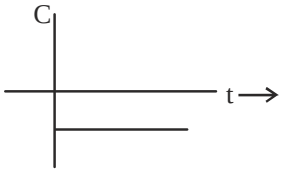
$C = \overline{A+B}.B$

$= \bar{A}.\bar{B}.B$

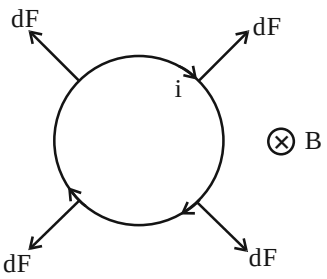
$= \bar{A}.(\bar{B}.B) \qquad (\because B.\bar{B} = 0)$

$= 0$

So, the output C is independent of input A and B. & the output is low i.e. (–1).

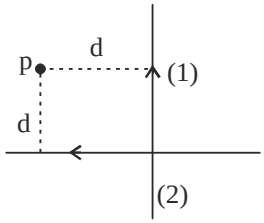


Q.30 (2)



Force on small elements are in outward normal direction. So, the loop has tendency to expand.

Q.31 **(1)**



$B_{net} = B_1 + B_2$

$$= \frac{\mu_0 i}{2\pi d}\hat{k} + \frac{\mu_0 i}{2\pi d}(-\hat{k}) = 0$$

Q.32 (4)

Induced emf, $e = -\frac{d\phi}{dt}$

$$e = -\frac{d\left(B\pi r^2\right)}{dt}$$

$$e = -B\pi\frac{dr^2}{dt}$$

$$e = -B\pi\left(2r\frac{dr}{dt}\right)$$

$1\times 10^{-6} = -10^{-3}\times\pi\times 2\times r\times(-10^{-2})$

$$r = \frac{10^{-6}}{10^{-5}\times 2\pi} = \frac{10^{-1}}{2\pi}\text{m}$$

Q.33 **(4)**

(A) $\phi = \vec{B}.\vec{A}$, (flux is scalar quantity).

(B) $\phi = BA\cos\theta$ If $\theta \le 0$: ϕ ⊖ve

$\theta = 90^o$: $\phi = 0$

$\theta > 0$: ϕ = ⊖ve

$\therefore$ Flux can be positive negative or zero

Q.34 (1)

Q-factor, $Q = \frac{1}{R}\sqrt{\frac{L}{C}}$

Given R = 6Ω, L = 36H, C = 100 μF

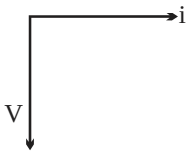
$$Q = \frac{1}{6}\sqrt{\frac{36}{100\times10^{-6}}}$$

$$Q = \frac{1}{6}\left(\frac{6}{10^{-2}}\right)$$

Q=100

Q.35 (4)

Purely capacitive circuit



current leads by $\frac{\pi}{2}$ from the voltage

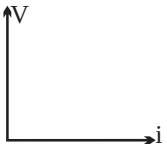
Purely resistive circuit ⟶ v i current and voltage are in same phase.

(C) In series LCR circuit if $X_C = X_L$ then

$$Z = \sqrt{R^2 + (X_L - X_C)^2} = R$$

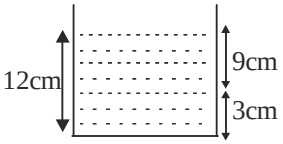
$\therefore$ power factor, $\cos\phi = \frac{R}{Z} = \frac{R}{R} = 1$

(D) Pure inductive circuit,



voltage leads current by π/2

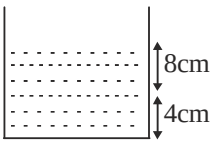
Q.36 (4)



$$d_{app} = \frac{d}{\mu} = \frac{12}{\mu_w}$$

$$9 = \frac{12}{\mu_w}$$

$$\mu_w = \frac{12}{9} = \frac{4}{3}$$



$$d_{app} = \frac{d'}{\mu'} = \frac{12}{1.5} = \frac{120}{15}$$

d' = 8 cm

So, to focus the microscope again on the needle, it is to be shifted by 9 – 8 = 1 cm

Q.37 (1)

u = – 15 cm v = –10 cm f = ?

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{1}{-10} - \frac{1}{-15} = \frac{1}{f}$$

$$\frac{-15+10}{150} = \frac{1}{f} \Rightarrow \frac{-5}{150} = \frac{1}{f} \Rightarrow f = -30 \text{ cm.}$$

Q.38 (2)

As $\lambda_{blue} < \lambda_{red}$, and width of diffraction bands is directly proportional to λ, therefore diffraction bands become narrower and crowded together.

Q.39 (1)

$n_1\lambda_1 = n_1\lambda_2$

$(12)(6000) = n_2\ (4800)$

$$n_2 = \frac{12\times6000}{4800} = 15 \qquad \text{Ans(a)}$$

Q.40 (4)

De - broglie wavelength of α - particle

$$\lambda = \frac{h}{\sqrt{2mq_\alpha V}}$$

$m_\alpha = 4m_p$, $q_\alpha = 2q_p$;

$$\lambda = \frac{h}{\sqrt{2(4mp)(2q_p)V}} = \frac{h}{2\sqrt{2}\sqrt{2m_pq_pV}} \qquad \text{... (1)}$$

De- broglie wavelength for proton

$$\lambda_P = \frac{h}{\sqrt{2m_pq_pV}} \qquad \text{... (2)}$$

From equation (1) and (2)

$$\lambda = \frac{\lambda_P}{2\sqrt{2}}$$

$$\lambda_P = 2\sqrt{2}\lambda$$

Q.41 **(3)**

$Li^{+} + = Z = 3$

Energy required for excitation

$$\Delta E = 13.6z^2\left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]$$

$$= 13.6(3)^2\left[\frac{1}{1^2} - \frac{1}{4^2}\right]\text{eV}$$

$$= (13.6)\times9\times\frac{15}{16} = 114.75\,\text{eV}$$

Q.42 (3)

(1) $_5B^{10} + {}_2He^4 \longrightarrow {}_7N^{13} + {}_1H^1$

Mass 10 + 4 = 14 = 13 + 1 = 14

Charge conservation 5 + 2 = 7 ≠ 7 + 1 = 8 $\therefore$ Not possible

(2) $_{11}Na^{24} + {}_1H^1 \longrightarrow {}_{10}Ne^{20} + {}_2He^4$

$24 + 1 = 25$ ¹ $20 + 4 = 24$ ∴ Not possible

(3) $_{93}Np^{239} \longrightarrow {}_{94}Pu^{239} + \beta^- + \bar{\nu}$

$239 = 239$

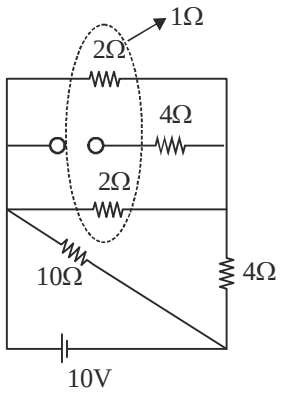
$93 = 94 - 1$ Possible

(4) $_7N^{11} + {}_1H^1 \longrightarrow gC^{12} + \beta^- + \bar{\nu}$

$11 + 1 = 12$ Not possible

$7 + 1 \neq 6$

Q.43 **(3)**



Diode D_1, D_3, D_4 are in forward biased condition while D_2 is in reversed biased.

$$R_{eq} = \frac{10 \times 5}{10 + 5} = \frac{50}{15} = \frac{10}{3}$$

$$i = \frac{10}{(10/3)} = 3A$$

Q.44 (3)

Diamagnetic substance → Repel

Paramagnetic substance → Weakly attract

Ferromagnetic substance → Strongly attract

Q.45 (3)

Given $1MSD = \frac{1}{20}cm$

$10\,VSD = 9\,MSD$

Least count $= 1\,MSD - 1\,VSD$

$$= 1\,MSD - \frac{9}{10}MSD$$

$$= \frac{1}{10}MSD$$

$$= \frac{1}{10} \times \frac{1}{20}cm$$

$$= \frac{1}{20}mm$$

$$= 0.05\,mm$$

Q.46 (3)

$$H_2 + \frac{1}{2}O_2 \longrightarrow H_2O$$

18gm. 64 gm mole = ?

Mole $\frac{18}{2}$ $\frac{64}{32}$

$$\frac{\text{mole}}{\text{coefficient}}\ \frac{9}{1} > \frac{2}{1/2}$$

So O_2 is limiting reagent.

$\therefore$ from $\frac{1}{2}$ mole $O_2 \longrightarrow$ 1 mole H_2O is produced

So from 2 mole $O_2 \rightarrow \frac{1}{0.5} \times 2 = 4$ mole H_2O is produced

Ans 4 mole.

Q.47 (1)

ψ^2 = Probability of finding the electron at a point in atom.

ψ = No physical signifcance

Q.48 **(2)**

Heisenberg's uncestaivity principle

$$\Delta x.\Delta P \geq \frac{h}{4\pi}$$

Q.49 **(3)**

I . E . Order : →

He > Ne > N > Be

Q.50 **(3)**

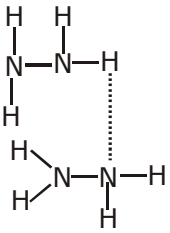
$N_2O \rightarrow$ Netural oxide

$CaO \rightarrow$ Basic oxide

$SnO_2 \rightarrow$ Amphoteric oxide

$Cl_2O_7 \rightarrow$ Acidic oxide

Q.51 (3)



Q.52 (3)

Covalent bond is directional bond

Q.53 (2)

In ground state Cl → $3s^2\,3p^5$

' Cl ' Show one valency .

In I[st] excited state

Cl → $3s^2, 3P^4\,3d^1$

' Cl 'Show three valency .

Q.54 (1)

$$CH_3COOH_{(\ell)} + 2O_{2(g)} \rightleftharpoons 2CO_{2(g)} + 2H_2O_{[\ell]}$$

$\Delta H = \Delta U + \Delta ng\ RT$

$\Delta n_g = 0$

$\Delta H = \Delta U = -874\,kJ$

Q.55 **(4)**

$CH_4 \rightarrow C + 4H \quad \Delta H = 360$

$\Delta H = 4 \times BE_{C-H}$

$B.E_{C-H} = \frac{\Delta H}{4} = \frac{360}{4} = 90\,kcal/mol$

for

$C_2H_6 \rightarrow 2C + 6H \quad \Delta H = 6220$

$\Delta H = B.E_{C-C} + 6 \times B.E_{C-H}$

$620 = B.E_{C-C} + 6 \times 90$

$BE_{C-C} = 620 - 540 = 80\,kcal/mol$

Q.56 **(1)**

In vaccume w = 0

because $P_{ext} = 0$

$\Delta U = q + w$

$\Delta U = 0$ because of isothermal process.

So q = 0

Q.57 (2)

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$$

At eq. Mole 1 2 2

$$K_P = \frac{\left(\frac{2}{5}\times 8.21\right)^2}{\left(\frac{1}{5}\times 8.21\right)}$$

$$\Rightarrow K_P = \frac{4}{5}\times 8.21$$

$$\Rightarrow K_P = K_C(RT)^{\Delta ng} \Rightarrow \frac{4}{5}\times 8.21 = K_C\ (0.0821\times 500)^1$$

$$\Rightarrow K_C = \frac{4\times 8.21}{5\times 0.0821\times 500} = 0.16$$

Q.58 (4)

Oxide is in reactant side so

Stability of reactant $\propto \frac{1}{Keq^m}$

So in option '4' Keq^m is lowest value.

Q.59 (4)

$SnCl_4$ stannic chloride

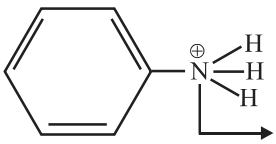
equivalent of $K_2Cr_2O_7$ = equivalent of $SnCl_4$

$$0.1\times v = \frac{1.19}{119}\times 4$$

$$v = \frac{1.19\times 4}{119\times 0.1}$$

$v = 0.4\,l = 400$ ml

Q.60 (3)

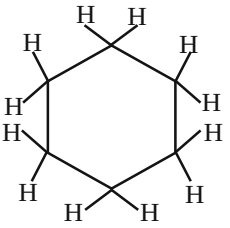


No vacant orbital

↓

Not show Resonance

Q.61 (4)

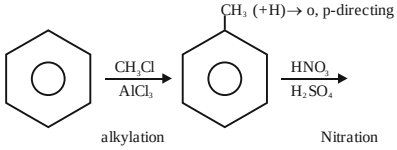


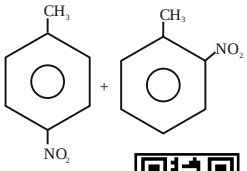
σ bonds = 18

π bonds = 0 CV

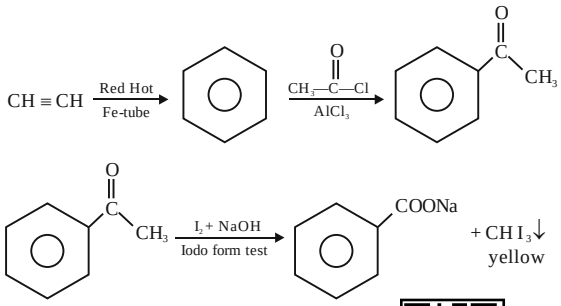
all carbons of cyclohexane all single bonded so all are sp^3 - hybridised.

Q.62 **(2)**

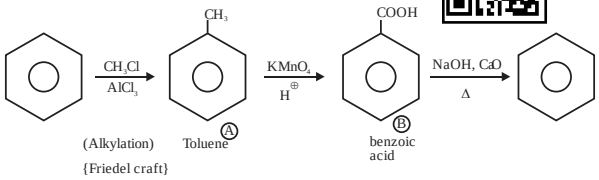




Q.63 (3)



Q.64 **(2)**



Q.65 (2)

In + ve deviation

$P_T > P_A^\circ X_A + P_B^\circ X_B$ &

$A-B < A-A$ or $B-B$

att. att. att.

Q.66 **(1)**

$$n_{Benzene} = \frac{78}{78} = 1$$

$$n_{toluene} = \frac{23}{92} = 0.25$$

$$P_T = 700 \times \frac{1}{1.25} + 650 \times \frac{0.25}{1.25}$$

$P_T = 560 + 130 = 690$

$$y_{toluene} = \frac{P_{toluene}}{P_{total}}$$

$$= \frac{130}{690} = 0.18$$

Q.67 (3)

$2H_2O \rightleftharpoons O_2 + 4H^+ + 4e^{\ominus}$

$\because$ 4 Faraday of charge liberate $O_2 = 32$ g cm

$\therefore$ 1 Faraday of charge liberate

$O_2 = \frac{32}{4}$ = 8 gm of oxygen

Q.68 **(2)**

$\overset{+3}{A}l_2O_3 + 3e^- \rightarrow Al$

$27\,gm \rightarrow 3F$

$40\,gm \rightarrow \frac{3}{27} \times 40 = \frac{40}{9}F$

Q.69 (4)

If the rate of reaction is doubled on doubling the concentration of reactant, then the order of reaction is first order.

(NEW NCERT 12 th Part-I Page No. 66)

Q.70 (2)

rate = $K[A]^n[B]^m$

$[A]_f = 2[A]$; and $r_f = 2r_i \Rightarrow n = 1$

$[A]_f = 2[A]_i$ and $[B]_f = 2[B]_i \Rightarrow m = 2$

Q.71 (2)

$P + Q \rightarrow 2R + S$

$$R.O.R = -\frac{d[P]}{dt} = \frac{-d[Q]}{dt} = \frac{1}{2}\frac{d[R]}{dt} = \frac{d[S]}{dt}$$

option (2) is wrong

Q.72 (4)

$25^oC \rightarrow 65^o \Rightarrow 40^o C \Rightarrow n = 4$

$$\frac{k_{t+10}}{k_t} = \frac{r_{t+10}}{r_t} = 2^4 = 16$$

Q.73 **(3)**

' N ' Not having vacant -d- orbital that's - why it never form 5-bonds

$E.N \rightarrow N > P$

Q.74 **(3)**

Radius $\rightarrow Te > Se > S > O$

I.P $\rightarrow O > S > Se > Te$

E.A. $\rightarrow S > Se > Te > O$

E.N. $\rightarrow O > S > Se > Te$

Q.75 **(3)**

$Np \rightarrow 5f^4\ 6d^1\ 7s^2$

Np can Show +3 to +7 Oxidation states

Q.76 **(2)**

$Eu \rightarrow 4f^7\ 6s^2$

$Eu^{2+} \rightarrow 4f^7$

$Gd \rightarrow 4f^7\ 5d^1\ 6s^2$

$Gd^{2+} \rightarrow 4f^7\ 5d^1$

Q.77 (2)

$2KMnO_4 + KI + H_2O \downarrow \ominus \rightarrow 2MnO_2 + 2OH + IO_3^{\ominus}$

Q.78 **(2)**

ligand field strength $\rightarrow$

$SCN^- < H_2O < en < CO$

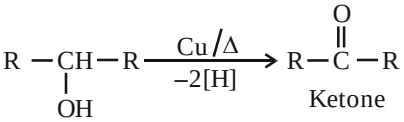
Q.79 **(3)**

Ambidentate ligand is a ligand which is having two donor sites but at a time one is functional . $\overset{\downarrow}{:S} = C = \overset{\downarrow}{\underset{\ominus}{N}:}$

Q.80 **(4)**

Reactivity towards $E_1 \propto$ stability of $C^{\oplus}$

Q.81 (2)



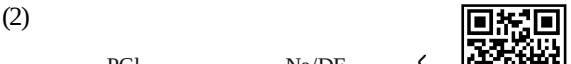
2°-Alcohol

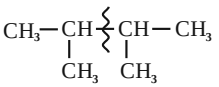
Q.82 (1)

$$\text{Boiling point} \propto \frac{1}{\text{Branching}}$$

Branching $\uparrow$ Surface area $\downarrow$ V.W. force $\downarrow$ B.P $\downarrow$

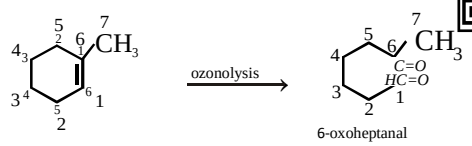
Q.83 (2)





R $\Rightarrow$ 

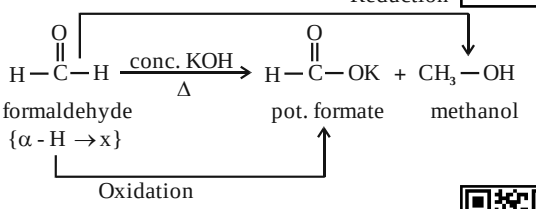
Q.84 (1)



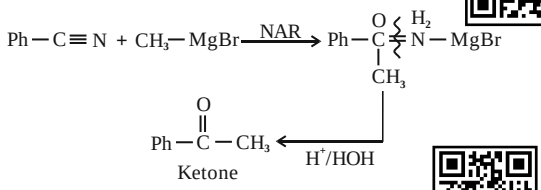
6-oxoheptanal

Q.85 (1)

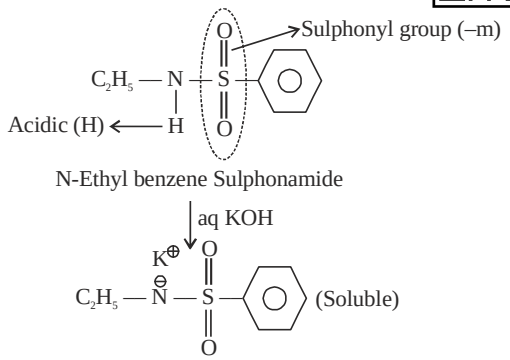
Cannizzaro reaction:-



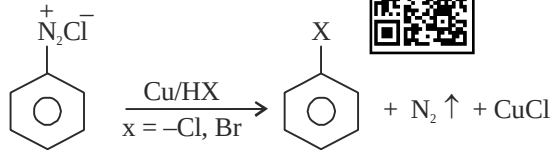
Q.86 (4)



Q.87 **(1)**



Q.88 **(1)**



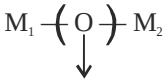
Gattermann reaction

Q.89 (4)

(i) Nucleic acids are responsible for heredity

(ii) $M_1 - O - H + H - O - M_2 \xrightarrow{-H_2O}$

Monosaccharides



Q.90 (1)

$$Na_2\left[Fe(CN)_5NO\right] + Na_2S \rightarrow Na_4\left[Fe(CN)_5NOS\right]$$

Violet Colour

Q.91 (3)

Q.92 (4)

Q.93 (3)

Q.94 (1)

The main plant body of pteridophyte is sporophyte and it is free living.

Q.95 (3)

Q.96 (1)

Q.97 (3)

Q.98 (3)

When the ovules are borne on central axis and septa are absent, as in Dianthus and Primrose, the placentation is called free central. Argemone shows parietal placentation.

Q.99 (1)

Arrangement called radial when xylem and phloem within a vascular bundle are arranged in an alternate manner along different radii. Such vascular bundles are found in the roots of dicots and monocots.

Q.100 (2)

Q.101 (2)

Q.102 (4)

Q.103 (4)

Q.104 (1)

Q.105 **(3)**

Q.106 (2)

Q.107 (3)

Q.108 (4)

Q.109 (1)

Q.110 (4)

Q.111 (3)

Q.112 (1)

Q.113 (4)

Q.114 (2)

Q.115 (4)

Q.116 (2)

Q.117 (3)

Q.118 (2)

NEW NCERT Pg. No -14

The flowers pollinated by flies and beetles secrete foul odours to attract these animals.

Q.119 (3)

NEW NCERT Pg. No -19

The portion of embryonal axis above the level of cotyledons is the epicotyl.

Q.120 (1)

Q.121 (1)

NEW NCERT Pg. No -11+

Three cells are grouped together at the micropylar end and constitute the egg apparatus. The egg apparatus in turn consists of two synergids and one egg cell.

Q.122 (2)

Q.123 (4)

Q.124 (3)

Q.125 (4)

Q.126 (3)

Q.127 (2)

Q.128 (1)

NEW NCERT Pg. No - 153

Lipases are used in detergent formulations and are helpful in removing oily stains from the laundry. Streptokinase produced by the bacterium *Streptococcus* and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.

Q.129 (4)

NEW NCERT Pg. No. - 173

Primers are (small chemically synthesised oligonucleotides that are complementary to the regons of DNA) and the enzyme DNA polymerase.

Q.130 (1)

NEW NCERT Pg. No. - 168

The separated bands of DNA are cut out from the agarose gel and extracted from the gel piece. This step is known as elution. The DNA fragments purified in this way are used in constructing recombinant DNA by joining them with cloning vectors.

Q.131 (4)

NEW NCERT Pg. No. - 180

Several nematodes parasitise a wide variety of plants and animals including

human beings. A nematode Meloidegyne incognitia infects the roots of tobacco plants and causes a great reduction in yield. A novel strategy was adopted to prevent this infestation which was based on the process of **RNA interference** (RNAi). RNAi takes place in all eukaryotic organisms as a method of cellular defense. This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing).
These two RNA's being complementary to each other formed a double stranded (dsRNA) that initiated RNA and thus, silenced the specific mRNA of the nematode.

Q.132 (1)

Q.133 (2)
NEW NCERT Pg. No -194

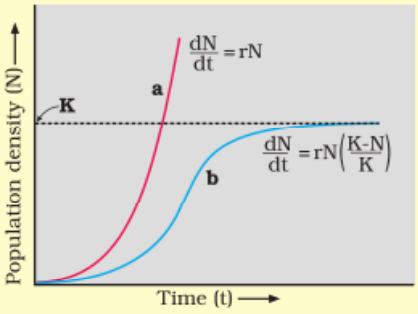


Figure 11.3 Population growth curve **a** when responses are not limiting the growth, plot is exponential, **b** when responses are limiting the growth, plot is logistic, **K** is carrying capacity

Q.134 (2)

Q.135 (3)

Q.136 **(1)**

Q.137 **(3)**
NEW NCERT Pg. No -223
The broadly utilitarian argument says that biodiversity plays a majirole in many ecosystem sendees that nature provides.
Pollination (without which plants cannot give us fruits or seeds) is another service, ecosystems provide through pollinators layer - bees, bumblebees, birds and bats.

Q.138 (3)
NEW NCERT Pg. No -217
Biodiversity is the term popularised by the sociobiologist Edward Wilson to describe the combined diversity at all the levels of biological organisation.
Geographer Alexander von Humboldt observed that within a region species richness increased with increasing explored area, but only up to a limit. There are no direct answers to such naive questions but we can develop a proper perspective through an analog (the 'rivet popper hypothesis] used by Stanford ecologist Paul Ehrlich.
Tilman found that plots with more species showed less year-to-year variation in total biomass. He also showed that in his experiments, increased diversity contributed to higher productivity.

Q.139 (3)
NEW NCERT Pg. No. - 47
Here Petromyzon are ectoparasites , bear 6 to 15 pair of gill slits , sucking and circular mouth, circulation is of closed type , migrate for spawning

Q.140 (1)
NEW NCERT Pg. No. - 42
The most distinctive feature of echinoderms is the presence of water vascular system which helps in locomotion, capture and transport of food and respiration.

Q.141 **(1)**
NEW NCERT Pg. No. - 48
Here in cartilaginous fishes, fertilization is internal, viviparous and in the absence of air bladder they have to swim constantly to avoid sinking
So here both the statements a and b are correct.

Q.142 (4)
NEW NCERT Pg. No. - 44
Parapodia is not present arthropoda, it is present in annelida

Q.143 (4)

Q.144 (4)

Q.145 (3)

Q.146 (3)

Q.147 (1)

Q.148 (2)

Q.149 (4)

Q.150 (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.151 (1)

Q.152 (2)

Q.153 (1)

NEW NCERT Pg. No. - 190

A specialised centre present in the medulla region of the brain called respiratory rhythm centre is primarily responsible for this regulation.

Q.154 (4)

NEW NCERT Pg. No -282

Crocodiles, birds and mammals possess a 4-chambered heart with two atria and two ventricles. In birds and mammals, oxygenated and deoxygenated blood received by the left and right atria respectively passes on to the ventricles of the same sides. The ventricles pump it out without any mixing up, i.e., two separate circulatory pathways are present in these organisms, hence, these animals have double circulation

Q.155 (1)

New NCERT PAGE NO. - 195

AB positive blood type is known as the "universal recipient" because AB positive patients can receive red blood cells from all blood types. Persons with AB groups have both antigen A and antigen B on its RBCs and no antibodies in their plasma.

Q.156 (1)

NEW NCERT Pg. No. - 213

a. Glycosuria — iii. Presence of glucose in urine
b. Renal calculi — i. Mass of crystallised salts within the kidney
c. Glomerular nephritis — ii. Inflammation in glomeruli

Q.157 (1)

NEW NCERT Pg. No. - 209

During urine formation, the tubular cells secrete substances like H^+, K^+ and ammonia into the filtrate. Tubular secretion is also an important step in urine formation as it helps in the maintenance of ionic and acid base balance of body fluids.

Q.158 **(4)**

Q.159 **(1)**

Q.160 (2)

NEW NCERT Pg. No. -233

When a stimulus is applied at a site (e.g., point A) on the polarised membrane, the membrane at the site A becomes freely permeable to Na^+. This leads to a rapid influx of Na^+ followed by the reversal of the polarity at that site, i.e., the outer surface of the membrane becomes negatively charged and the inner side becomes positively charged. The polarity of the membrane at the site A is thus reversed and hence depolarised.

Q.161 (4)

NEW NCERT Pg. No - 245

Glucocorticoids stimulate gluconeogenesis, lipolysis and proteolysis; and inhibit cellular uptake and utilisation of amino acids.

Q.162 (4)

NEW NCERT Pg. No - 38

By the end of about 24 weeks (end of second trimester), the body is covered with fine hair, eye- lids seperate and eyelashes are formed. By the end of nine months of pregnancy, the foetus is fully developed and is ready for delivery.

Q.163 (3)

Q.164 (2)

NEW NCERT Pg. No. -48

GIFT, AI, and IUI involve in vivo fertilization as the sperm and egg meet inside the female body. ZIFT, ICSI, and IUT involve external fertilization or manipulation before transfer.

Q.165 (4)

Q.166 (2)

Q.167 (1)

NEW NCERT Pg. No. -91

During transcription, only one DNA strand is used as a template.

If both strands were transcribed, the resulting RNA molecules would be complementary and could interfere with proper protein synthesis, leading to conflicting sequences.

Q.168 (3)

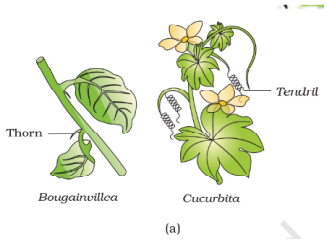
NEW NCERT Pg. No. -104

Single Nucleotide Polymorphisms (SNPs) are variations in a single nucleotide at specific positions in the genome and occur commonly in populations. SNPs are not genes (option 1), not limited to sex chromosomes (option 2), and are not repeated DNA stretches (option 4). Instead, they repr esent variations responsible for genetic diversity.

Q.169 (2)

NEW NCERT Pg. No -115

In plants also, the thorn and tendrils of Bougainvillea and Cucurbita represent homology. Homology is based on divergent evolution.



(a)

Q.170 (1)

NEW NCERT Pg. No -116

During post-industrialisation period, the tree trunks became dark due to industrial smoke and soots. Under this condition the white winged moth did not survive due to predators, dark-winged or melanised moth survived.

Q.171 (4)

NEW NCERT Pg. No -119

Hugo deVries based on his work on evening primrose brought forth the idea of mutations - large difference arising suddenly in a population. He believed that it is mutation which causes evolution and not the minor variations (heritable) that Darwin talked about. Mutations are random and directionless while Darwinian variations are small and directional.

Q.172 (2)

NEW NCERT Pg. No -140

NACO→National AIDS Control Organisation

ELISA→Enzyme Linked Immuno Sorbent Assay

AIDS→Acquired Immuno Deficiency Syndrome

Q.173 (1)

NEW NCERT Pg. No. -134 , 135

	Column I		Column II
(a)	Physical bariers	(iii)	Skin
(b)	Physiological barriers	(ii)	Tears from eyes
(c)	Cellular barriers	(iv)	NK Cells
(d)	Cytokine barriers	(i)	Inteferons

Q.174 (3)

NEW NCERT Pg. No -143

Cocaine, commonly called coke or crack is usually snorted. It has a potent stimulating action on central nervous system, producing a sense of euphoria and increased energy.

Morphine is a very effective sedative and painkiller, and is very useful in patients who have undergone surgery.

Tobacco contains a large number of chemical substances including nicotine, an alkaloid. Nicotine stimulates adrenal gland to release adrenaline and nor-adrenaline into blood circulation, both of which raise blood pressure and increase heart rate.

Tobacco chewing is associated with increased risk of cancer of the oral cavity. Smoking increases carbon monoxide (CO) content in blood.

Q.175 **(4)**

NEW NCERT Pg. No -142

Treatment of cancer: The common approaches for treatment of cancer are surgery, radiation therapy and immunotherapy.

Q.176 **(1)**

NEW NCERT Pg. No -131

Plasmodium enters the human body as sporozoites (infectious form) through the bite of infected female Anopheles mosquito. The parasites initially multiply within the liver cells and then attack the red blood cells (RBCs) resulting in their rupture. The rupture of RBCs is associated with release of a toxic substance, haemozoin, which is responsible for the chill and high fever recurring every three to four days.

Q.177 **(3)**

Q.178 (2)

Q.179 (4)

Q.180 (3)