AIPMT

SOLUTIONS FULL SYLLABUS TEST

(1) **(3).** Energy difference first and second orbits is very large as compared to energy difference between higher orbits.
उच्च कक्षकों के मध्य ऊर्जा अंतर की तुलना में प्रथम और द्वितीय कक्षकों के मध्य ऊर्जा अंतर अत्यधिक होता है।

(2) **(4).** For d-electron ℓ has to be 2, spin quantum number can have only two values $+\frac{1}{2}$ or $-\frac{1}{2}$.
d-इलेक्ट्रॉनों के लिए $\ell = 2$ होना चाहिए चक्रण क्वांटम संख्या के केवल दो मान $+\frac{1}{2}$ या $-\frac{1}{2}$ हो सकते हैं।

(3) **(2).** Let solution 1000mL,
$W_{solution} = 1000gm$
$W_{solute} = x\ gm$
$W_{solvent} = (1000 - x)\ gm$

$$\therefore 0.2 = \frac{\frac{x}{40}}{\left(\frac{x}{40}\right)+\left(\frac{1000-x}{18}\right)} \Rightarrow x = 357.14\ gm.$$

$$\therefore n_{NaOH} = \frac{357.14}{40} = 8.9\ mole$$

$\therefore$ Molarity = 8.9 molar

(4) **(4).** In third energy level (n = 3) ($\ell = 2$) have 10 electrons.
तृतीय ऊर्जा स्तर (n = 3) में, $\ell = 2$ के लिए 10 इलेक्ट्रॉन होते हैं।

(5) **(1).** PV = nRT
At constant volume (स्थिर आयतन पर)

$$\frac{P_1}{P_2} = \frac{n_1T_1}{n_2T_2} \text{ or } \frac{P}{P/2} = \frac{(6/32)\times 400}{n_2 \times 300}$$

or $n_2 = 0.125$ mole = 4gm
Hence O_2 leaks out = 6 – 4 = 2gm.

(6) **(3).**

	$XY_2(g) \rightleftharpoons$	$XY(g)$	$+\ Y(g)$
t = 0	500 torr	0	0
$t = t_{eq}$	(500 – x)	x	x

Total pressure at equilibrium = (500 + x)
साम्य पर कुल दाब = (500 + x)
500 + x = 600
x = 100 torr

$$K_P = \frac{P_{XY}\times P_Y}{P_{XY_2}} = \frac{100\times 100}{400} = 25\ torr$$

(7) **(3).** $2NO \rightleftharpoons N_2 + O_2$; $K_1 = 4 \times 10^{30}$

$$N_2 + O_2 \rightleftharpoons 2NO;\quad K' = \frac{1}{K_1} = \frac{1}{4\times 10^{30}}$$

Divide by 2,

$$\text{(i) } \frac{1}{2}N_2 + \frac{1}{2}O_2 \rightleftharpoons NO;\quad K'' = \sqrt{K'} = \frac{1}{2\times 10^{5}}$$

$$\text{(ii) } NO + \frac{1}{2}Br_2(g) \rightleftharpoons NOBr;\quad K_2 = 1.4\ mol^{-1/2}\,L^{1/2}$$

On adding (i) & (ii)

$$\frac{1}{2}N_2(g) + \frac{1}{2}O_2(g) + \frac{1}{2}Br_2(g) \rightleftharpoons NOBr\,(g)$$

$$K = K'' \times K_2 = \frac{1.4}{2\times 10^{5}} = 7.0 \times 10^{-16}$$

(8) **(4).** Due to no change in oxidation number.
ऑक्सीकरण संख्या में कोई परिवर्तन नहीं होने के कारण

(9) **(4).** $\Delta H = (E_a)_f - (E_a)_b$
$-80 = (E_a)_f - 2(E_a)_f$ $\{\because (E_a)_b = 2\,(E_a)_f\}$
$(E_a)_f = 80kJ$
$\therefore (E_a)_b = 160kJ$

(10) **(4).** Heat absorbed = +ve
अवशोषित ऊष्मा = +ve
W (on the system/by the surroundings) = +ve
W (तंत्र पर/परिपार्श्व द्वारा) = +ve
Heat released = –ve
मुक्त ऊष्मा = –ve
W (by the system/on the surroundings) = –ve
W (तंत्र द्वारा/परिपार्श्व द्वारा) = –ve
$\therefore$ All are statements correct
सभी कथन सत्य है।

(11)(1).
$$4FeCr_2O_4 + 16NaOH + 7O_2 \longrightarrow 8Na_2CrO_4 + 2Fe_2O_3 + 8H_2O$$
Let the oxidation state of Cr in CrO_4^{2-} is x
So, x + 4 (–2) = – 2 or x = 6
माना कि CrO_4^{2-} में Cr का ऑक्सीकरण अंक x है।
अतः x + 4 (–2) = – 2 या x = 6

(12) **(2).** $1Pa = 1 \times 10^5\ N/M^2$
Net work done = Area covered by PV curve
= Area of Δ ABE + Area of square BCFE + Area of Δ CDF

$$= \left[\left\{\frac{1}{2}(3\times 10^5 - 1\times 10^5)\times(3-1)\right\} + \{3\times 10^5 - 1\times 10^5)\right.$$

$$\left.(5-3\} + \left\{\frac{1}{2}(3\times 10^5 - 1\times 10^5)\times(6-5)\right\}\right]$$

$$= -\left[\left\{\frac{1}{2}\times 4\times 10^5\right\} + \{4\times 10^5\} + \left\{\frac{1}{2}\times 2\times 10^5\right\}\right]$$

$= -7 \times 10^5$ J

(13) **(2).** It decreases rate of reaction.
यह अभिक्रिया दर को कम करता है।

(14) **(3).** Difference between IE_1 and IE_2 is very large for Na.
Na के लिए IE_1 तथा IE_2 के मध्य अंतर बहुत अधिक है।

(15) **(3).** Al has larger radius than Ga, S^{2-}, Cl^- & K^+ are isoelectric.
Al की Ga, S^{2-}, Cl^- & K^+ से अधिक त्रिज्या है तथा समइलेक्ट्रॉनिक है।

(16) **(1).** $B(OH)_3$ accepts OH^-.
$B(OH)_3$ OH^- को ग्रहण करता है।

(17) **(2).** Soap forms ppt. with hard water.
साबुन कठोर जल के साथ अवक्षेप का निर्माण करता है।

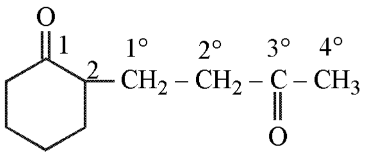
(18) **(2).** Calgon method.

(19) **(4).** PbO escapes out.

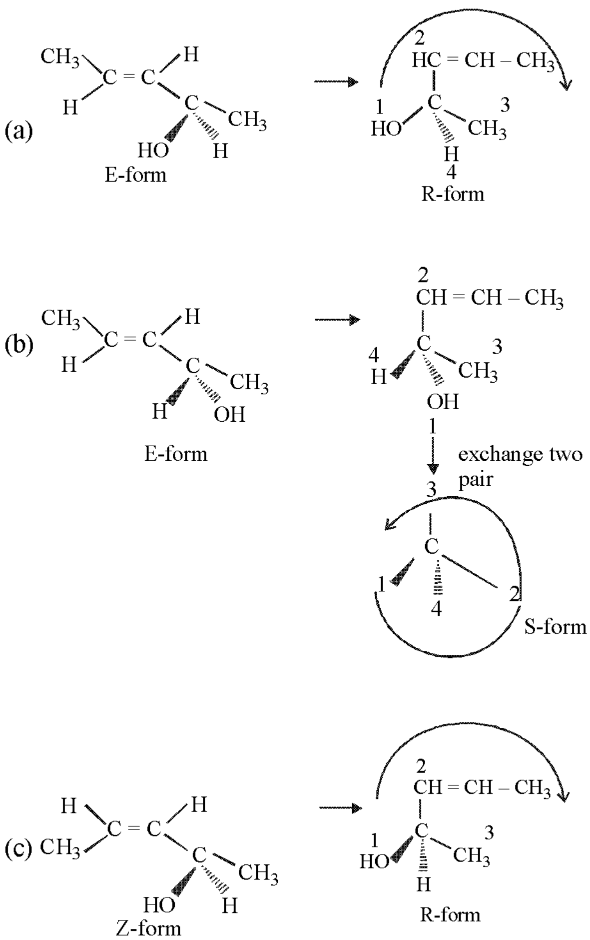
(20) **(4).** Presence of EWG makes ArS_N2 easy and compound (4) have maximum EWG

(21) **(3).** Compound (3) have no chiral carbon.

(22) **(4).**



(23) **(2).**



(24) **(2).**
$Cl-CH_2-COOH > Cl-CH_2-CH_2-COOH > CH_3-COOH$

$\begin{pmatrix}-I\text{ group}\\ \text{distance}\downarrow\end{pmatrix}$ $\begin{pmatrix}-I\text{ group}\\ \text{distance}\uparrow\end{pmatrix}$ $(+I\text{ group})$

$CH_3-CH_2-COOH > (CH_3)_2CH-COOH$

$(+I\text{ group})$ $(+I\text{ group})$

(25) **(1).** $-OCH_3$ is o,p-directing group due to its +M and –I effect.

(26) **(2).** $CH_3-CH_2CH=CH_2 \xrightarrow{Br_2/CCl_4}$

$H_3C-CH_2-CH(Br)-CH_2(Br)$

$\xrightarrow[\Delta]{NaNH_2,\,-2HBr} CH_3-CH_2-C\equiv CH$

(27) **(2).** $E=\dfrac{m}{Q}\times 96500=\dfrac{3}{9.65\times 600}\times 96500=50$

$\text{At. wt.}=\dfrac{E}{\text{valency}}=\dfrac{50}{1}=50$

(28) **(2).** $K=\dfrac{1}{R}\times\text{Cell const.}=\dfrac{0.4}{40}=10^{-2}$

$\Lambda_m=\dfrac{K\times 1000}{\text{molarity}}=\dfrac{10^{-2}\times 1000}{10^{-2}}=1000$

$=10^3\ ohm^{-1}\ cm^2\ mol^{-1}$

(29) **(3).** $Al^{+3}+3e^-\longrightarrow Al$
3 mol 27g
In order to deposite 27g of Al, electricity required = 3F
27g Al एकत्रित करने के लिए, आवश्यक विद्युत = 3F
In order to deposit 9g of Al, electricity required

$=\dfrac{3F}{27}\times 9=1F$

9g Al, एकत्रित करने के लिए, आवश्यक विद्युत $=\dfrac{3F}{27}\times 9=1F$

(30) **(1).** Apply nernst equation to the reaction
अभिक्रिया की नर्स्ट समीकरण लगाने पर
$Pb+Sn^{+2}\longrightarrow Pb^{+2}+Sn$

or $E^\circ+\dfrac{0.059}{2}\log\dfrac{[Sn^{+2}]}{[Pb^{+2}]}=E_{cell}$

or $\log\dfrac{[Sn^{+2}]}{[Pb^{+2}]}=\dfrac{0.01\times 2}{0.059}=0.3$ $(\because\ E_{cell}=0)$

or $\dfrac{[Sn^{+2}]}{[Pb^{+2}]}=\text{anti}\log(0.3)$

(31) **(4).** Solubility S = Normality of saturated solution

$$N = \frac{K \times 1000}{\lambda} = \frac{3.06 \times 10^{-6} \times 1000}{1.53} = 2 \times 10^{-3}\ \text{mol L}^{-1}$$

$K_{sp} = S^2 = 4 \times 10^{-6}$

(32) **(2).** Number of X atoms per unit cell

$= \frac{6}{8}$ (2 corners vacant)

प्रति एकक कोशिका में X परमाणुओं की संख्या

$= \frac{6}{8}$ (दो कोने रिक्त)

Number of Y atoms per unit cell $= \frac{6}{2} = 3$

प्रति एकक कोशिका में X परमाणुओं की संख्या $= \frac{6}{2} = 3$

The formula is $X_{6/8}Y_3$ or X_6Y_{24} or XY_4

(33) **(3).** O^{-2} ions $= \frac{8}{8} + \frac{6}{2} = 4$

Ti^{+4} ions $= \frac{1}{2} \times$ octahedral voids (= no. of sphere in ccp)

$= \frac{1}{2} \times 4 = 2$

Hence formula is TiO_2

(34) **(4).** (1) Ignition temperature :
White phosphorus $\approx 30°C$, Red phosphorus $> 400°C$
(2) White phosphorus is soluble in CS_2 but red phosphorus is insoluble in CS_2
(3) $P_4 + 3NaOH + 3H_2O \longrightarrow PH_3(g) + 3NaH_2PO_2$
Red phosphorus is inert towards NaOH.
(4) $P + 5NHO_3 \longrightarrow H_3PO_4 + 5NO_2\uparrow + H_2O$
Reaction is given by both white and red phosphorus.
(1) सफेद फास्फोरस का ज्वलन ताप $\approx 30°C$
जबकि लाल फास्फोरस का ज्वलन ताप $> 400°C$
(2) सफेद फास्फोरस CS_2 में विलेय है परन्तु लाल फास्फोरस CS_2 में अविलेय है।
(3) $P_4 + 3NaOH + 3H_2O \longrightarrow PH_3(g) + 3NaH_2PO_2$
लाल फास्फोरस NaOH के प्रति अक्रिय है।
(4) $P + 5NHO_3 \longrightarrow H_3PO_4 + 5NO_2\uparrow + H_2O$
यह अभिक्रिया सफेद तथा लाल फास्फोरस दोनों द्वारा दी जाती है।

(35) **(3).** $Cr_2O_7^{2-}$ has no unpaired d-electron
$Cr_2O_7^{2-}$ में अयुग्मित d-इलेक्ट्रॉन नहीं होते हैं।

(36) **(3).** $MnO_2 + KOH + O_2 \xrightarrow{\Delta} \underset{\text{(green)}}{K_2MnO_4} + H_2O$

$K_2MnO_4 + Cl_2 \longrightarrow \underset{\text{(Pink)}}{KMnO_4} + KCl$

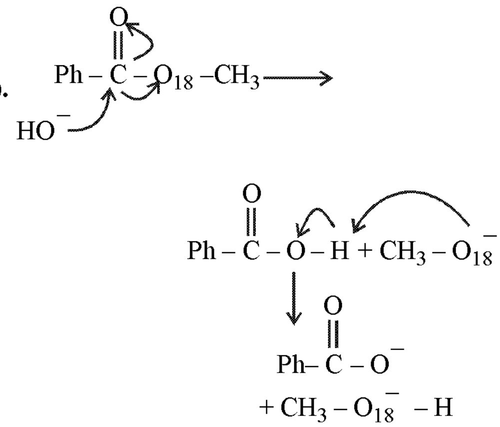
(37) **(3).** ZnO is amphoteric
ZnO उभयधर्मी है।

(38) **(3).** $[Pt(gly)_2]$ is a square planar complex.
$[Pt(gly)_2]$ वर्ग समतलीय संकुल है।

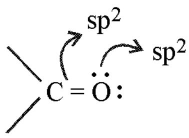
(39) **(3).** Cis-$[M(aa)_2b_2]^{3+}$ shows optical isomerism.
समपक्ष–$[M(aa)_2b_2]^{3+}$ प्रकाशिक समावयवता दर्शाता है।

(40) **(1).** $[Ni(NH_3)_6]^{2+}$ shows sp^3d^2 hybridisation.
$[Ni(NH_3)_6]^{2+}$ sp^3d^2 संकरण दर्शाता है।

(41) **(2).**



(42) **(3).**

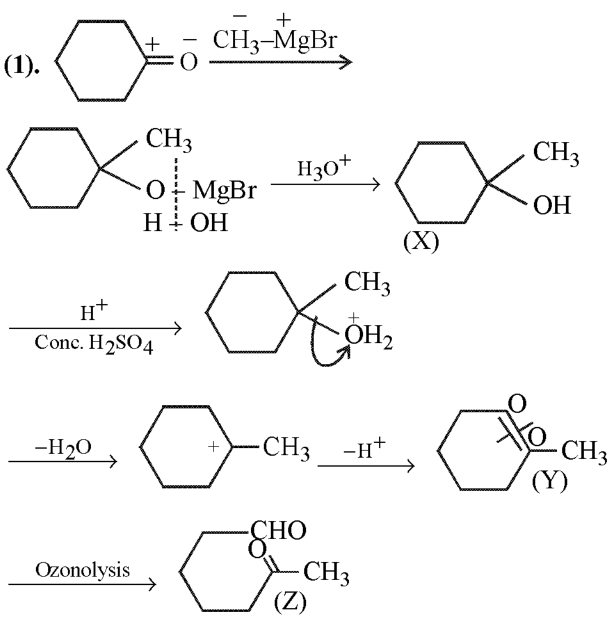


Plane geometry.

(43) **(3).** It's a nucleophilic addition so recamic mixture is formed.
यह एक नाभिकस्नेही योग है अतः रेसेमिक मिश्रण का निर्माण होगा।

(44) **(1).** SeO_2 oxidises at α-carbon.
SeO_2 α कार्बन पर ऑक्सीकरण देता है।

(45) **(1).**



(46) **(2).** Paracetamol is analgesic and antipyretic.
पैरासिटामोल दर्द निवारक तथा प्रतिज्वरकारक है।

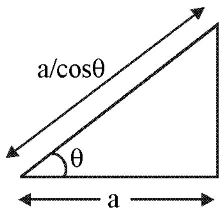
(47) **(3).** Blue colour is due to $Fe_3[Fe(CN)_6]_3$
$Fe_3[Fe(CN)_6]_3$ के कारण नीला रंग होता है।

(48) **(1).** Yellow colour is due to $(NH_4)_3PO_4.12MoO_4$
$(NH_4)_3PO_4.12MoO_4$ के कारण पीला रंग होता है।

(49) **(3).** Green chemistry target to reduce energy and waste generation.
हरित रसायन का लक्ष्य ऊर्जा तथा अनुपयोगी उत्पादन को कम करना होता है।

(50) **(3).** Tranquilizers reduce stress.
प्रशान्तक तनाव को कम करते हैं।

(51) **(3).**



By using, $\vec{s} = \vec{u}t + \frac{1}{2}\vec{a}t^2$

$$\frac{a}{\cos\theta} = \frac{1}{2}(g\sin\theta)\,t^2$$

$$t = \sqrt{\frac{2a}{g\sin\theta\cos\theta}} = \sqrt{\frac{4a}{g\sin 2\theta}}$$

$t \to \min$
$\sin 2\theta = 1$
$\theta = 45°$

(52) **(3).** Initial velocity of ball is zero i.e., $u = 0$
गेंद का प्रारम्भिक वेग शून्य है अर्थात् $u = 0$
$\therefore$ Displacement of ball in t^{th} second is
$\therefore$ t वें सेकण्ड में गेंद का विस्थापन है

$$s = gt - \frac{1}{2}g = g\left(t - \frac{1}{2}\right)$$

$$\therefore\ s \propto \left(t - \frac{1}{2}\right)$$

or $s_1 : s_2 : s_3 = \left(1-\frac{1}{2}\right) : \left(2-\frac{1}{2}\right) : \left(3-\frac{1}{2}\right) = 1 : 3 : 5$

Now $W = mgs$ or $W \propto s$
$\therefore\ W_1 : W_2 : W_3 = 1 : 3 : 5$

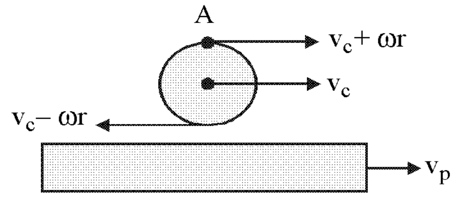
(53) **(2).** $a = \dfrac{(m_2 - m_1)}{(m_1 + m_2)}g$

$$a = \left(\frac{60-40}{60+40}\right) \times 10 = 2\ m/s^2$$

(54) **(4).** $S = \dfrac{\beta.\alpha t^2}{2(\alpha+\beta)} = \dfrac{2\times4\times3\times3}{2(2+4)} = 6m$

(55) **(1).** Relative velocity is 15 m/s
Length of train = $15 \times 8 = 120m$.

(56) **(3).**



For pure rolling velocity of the point of contact has to be equal to the velocity of the surface.
Let's say cylinder rolls with angular velocity ω.
At point B, $v_c - \omega r = v_p \Rightarrow \omega r = v_c - v_p$
At point A, $v_A = v_c + \omega r = 2v_c - v_p$

(57) **(1).** After collision, $v_2 = \left(\dfrac{1+e}{2}\right)u$ and $v_1 = \left(\dfrac{1-e}{2}\right)u$

Here, u = initial speed of ball 1
$v_2 = 2v_1$, when $e = 1/3$

(58) **(1).** We have $T^2 \propto r^3$ and proportionality constant does not depend on the mass of orbiting body. So, option (1) is correct
हम जानते हैं $T^2 \propto r^3$ तथा समानुपातिक नियतांक घूमती हुई वस्तु के द्रव्यमान पर निर्भर नहीं करता है। इसलिए विकल्प (1) सही है।

(59) **(1).**

$$X_{CM} = \frac{m_1x_1 + m_2x_2 + ...}{m_1 + m_2 + ...} = \frac{m\ell + 2m.2\ell + 3m.3\ell + ...}{m + 2m + 3m + ...}$$

$$= \frac{m\ell\,(1+4+9+.....)}{m\,(1+2+3+.....)} = \frac{\ell\dfrac{n\,(n+1)\,(2n+1)}{6}}{\dfrac{n\,(n+1)}{2}} = \frac{\ell\,(2n+1)}{3}$$

(60) **(2).** $W = \Delta E = T\,(4\pi R^2) \times 2$
$= 8\pi R^2 T = 8 \times \pi \times 10^{-4} \times 1.9 \times 10^{-2}$
$= 15.2 \times 10^{-6}\,\pi J$

(61) **(4).** $\dfrac{Y_A}{Y_B} = \dfrac{\tan 60°}{\tan 30°} = \dfrac{\sqrt{3}}{1/\sqrt{3}} = 3$ or $Y_A = 3Y_B$

(62) **(3).** temperature $\uparrow$, surface tension $\downarrow$, height $\downarrow$
So, $\theta_2 > \theta_1$.

(63) **(1).** In the process PV^x = constant molar heat capacity is given by

$$C = \frac{R}{\gamma - 1} + \frac{R}{1 - x}$$

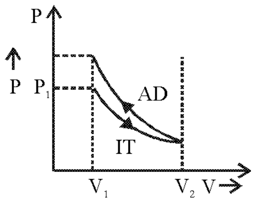
Here the process is PV^{-1} = constant i.e, $x = -1$
and gas is monoatomic, Therefore $\gamma = 5/3$

$$\therefore\ C = \frac{R}{\frac{5}{3} - 1} + \frac{R}{1-(-1)} = 2R$$

$\therefore\ \Delta Q = nC\Delta T\ (n = 1)$
$= (1)\,(2R)\,(2T_0 - T_0) = 2RT_0$

(64) **(1).** $T_{mix} = \dfrac{\mu_1T_1 + \mu_2T_2}{\mu_1 + \mu_2} = \dfrac{2T_0 + 4\,(2T_0)}{6} = \dfrac{5}{3}T_0$

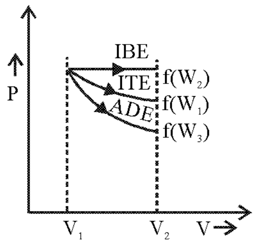
(65) **(3).**



(66) **(2).** $W = P\Delta V = 1.01 \times 10^5 \times 1670 \times 10^{-6}$ joule

$W \simeq 167 \text{ Joule} = \frac{167}{4.2} \text{ cal} \simeq 40 \text{ cal.}$

(67) **(1).**



$\Rightarrow W_2 > W_1 > W_3$

(68) **(4).** Loss of heat $\Delta Q = A\varepsilon\sigma (T_4 - T_0{}^4)t$

$\Rightarrow$ Rate of loss of heat $\frac{\Delta Q}{t} = A\varepsilon\sigma (T_4 - T_0{}^4)t$

$= 10 \times 10^{-4} \times 1 \times 5.67 \times 10^{-8}$

$[(273 + 127)^4 - (273 + 27)^4] = 0.99$ W

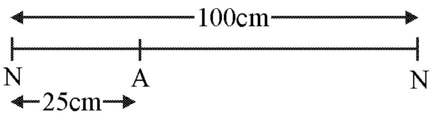
(69) **(4).** Initially $\eta = \frac{T_1 - T_2}{T_1} \Rightarrow 0.5 = \frac{T_1 - (273 + 7)}{T_1}$

$\Rightarrow \frac{1}{2} = \frac{T_1 - 280}{T_1} \Rightarrow T_1 = 560$ K

Finally $\eta_1 = \frac{T_1' - T_2}{T_1'} \Rightarrow 0.7 = \frac{T_1' - (273 + 7)}{T_1'}$

$\Rightarrow T_1' = 933$ K

(70) **(3).**



where plucked, antinode is formed.

So, $\frac{\lambda}{4} = 25\text{cm} \qquad \therefore \lambda = 100\text{cm}.$

Now, $n = \frac{v}{\lambda} = \frac{1}{\lambda}\sqrt{\frac{T}{m}} = \frac{1}{1}\sqrt{\frac{20}{5 \times 10^{-4}}} = 200$ Hz

(71) **(2).** $I_{max} = (\sqrt{I_1} + \sqrt{I_2})^2 = (\sqrt{I_1} + \sqrt{4I})^2 = 9I$

$I_{min} = (\sqrt{I_1} - \sqrt{I_2})^2 = (\sqrt{I_1} - \sqrt{4I})^2 = I$

(72) **(2).** Since velocity is independent of pressure so no change.
चूंकि वेग दाब पर निर्भर नहीं करता है अत: कोई परिवर्तन नहीं होता है।

(73) **(1).** $\frac{3v}{4\ell} = \frac{v}{2\ell} + 100 \;;\; \frac{3v - 2v}{4\ell} = 100 \;;\; \frac{v}{4\ell} = 100$

Fundamental frequency of open pipe $= \frac{v}{2\ell} = 200$Hz

(74) **(2).** $\Delta\phi = (\omega t + \pi/2) - (\omega t + \pi/3) = \pi/6$

(75) **(3).** $v = \omega\sqrt{a^2 - x^2}$

$K.E. = \frac{1}{2}\omega^2 m(a^2 - x^2)$

$PE = \frac{1}{2}Kx^2 = \frac{1}{2}m\omega^2 x^2$

$K.E. = P.E. \Rightarrow \frac{1}{2}m\omega^2(a^2 - x^2) = \frac{1}{2}m\omega^2 x^2$

At $x = \pm \frac{a}{\sqrt{2}}$

(76) **(4).** $y = a\cos^2\left(2\pi nt - \frac{2\pi x}{\lambda}\right)$

$= a\left[\frac{1}{2} + \frac{1}{2}\cos 2\left(2\pi nt - \frac{2\pi}{\lambda}x\right)\right]$

$= \frac{a}{2} + \frac{a}{2}\cos 2\left(2\pi nt - \frac{2\pi}{\lambda}x\right)$

(77) **(1).** $R_{eq} = R_1 + R_2 + ...$

$\frac{\rho_{eq}(N\ell)}{A} = \frac{\rho_1\ell}{A} + \frac{\rho_2\ell}{A} + ...$

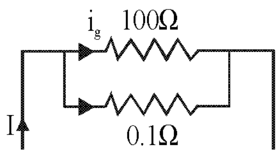
$\rho_{eq} = \frac{\rho_1 + \rho_2 + ...}{N}$

(78) **(1).**

$i_g \times 100 = (I - i_g)\, 0.1$

here $i_g = 100\ \mu A$

so that $\quad I = 100.1$ mA



(79) **(3).** $E_{ring} = \frac{KQx}{(R^2 + x^2)^{3/2}}$

if $x << R \quad E_1 = \frac{KQx_1}{R^3}$

if $x >> R \quad E_2 = \frac{KQx_2}{x_2^3}$

Now $\quad E_1 = E_2$

$\frac{x_1}{R^3} = \frac{1}{x_2^2} \;;\; R = (x_2{}^2.x_1)^{1/3}$

(80) **(1).** Torque $\tau = MB\sin\theta = (m\ell)B\sin\theta$

$= 0.1 \times 10^{-3} \times 4\pi \times 10^{-3} \times \sin 30^0$

$= 10^{-7} \times 4\pi \times \frac{1}{2} = 2\pi \times 10^{-7}$ N × m

(81) **(1).** $-\frac{dv}{dt}=E$

$dv=-\int E.dr$

$v-v_0=-\frac{Ar^2}{2}$

$v=-\frac{Ar^2}{2}+v_0$

(82) **(1).** Let smaller part be = x ; bigger part = (20–x)
Hence resistance of smaller & bigger = x and (20 – x)

$\frac{x.(20-x)}{20}=1.8$ gives x = 2 m

(83) **(4).** By using $B=\frac{\mu_0 i}{2\pi r}\left(\frac{r^2-a^2}{b^2-a^2}\right)$

here $r=\frac{3R}{2}$, a = R, b = 2R

$$\Rightarrow B=\frac{\mu_0 i}{2\pi\left(\frac{3R}{2}\right)}\times\left\{\frac{\left(\frac{3R}{2}\right)^2-R^2}{(2R)^2-R^2}\right\}=\frac{5\mu_0 i}{36\pi R}$$

(84) **(4).** $\phi=BA\cos\omega t$

$emf=\frac{-d\phi}{dt}=BA\omega\sin\omega t$

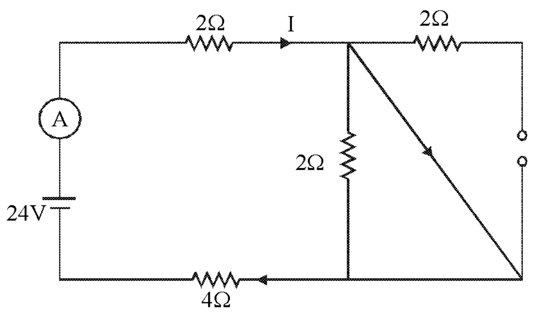
$E=\frac{\mu_0 I}{2R}\times A\times\omega\sin\omega t$

$E=\frac{4\pi\times10^{-7}\times1}{2\times0.1}\times5\times10^{-4}\times\omega\sin\omega t$

$E=\pi\times10^{-9}\,\omega\sin\omega t$

$i=\frac{E}{R}=\frac{\pi\times10^{-9}}{2}\omega\sin\omega t$

(85) **(1).**



At t = ∞ (long time after closing the switch)
Capacitor acts open circuit where as inductor acts at short circuit.

Hence, $I=\frac{24}{6}=4A$

$t=\infty$ पर (स्विच बंद करने के बहुत देर पश्चात्)
संधारित्र एक खुल परिपथ की तरह कार्य करता है जबकि लघु पथन पर प्रेरकत्व की तरह कार्य करता है। अतः $I=\frac{24}{6}=4A$

(86) **(3).** $\varepsilon=\frac{B\omega R^2}{2}=\frac{0.1\times(2\pi\times20)\,(0.1)^2}{2}$

$=20\pi\times10^{-3}$ volt

(87) **(2).** $V_{source}=\sqrt{V_R^2+V_C^2}$

$\therefore V_C=\sqrt{V_{source}^2-V_R^2}=\sqrt{(20)^2-(12)^2}=16V$

(88) **(3).** $i_{rms}=\{<i^2>\}^{1/2}$

$\{<i_1^2\cos^2\omega t+i_2^2\sin^2\omega t+2i_1i_2\sin^2\omega t>\}^{1/2}$

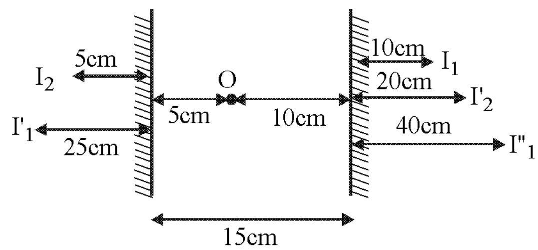
$=\sqrt{\frac{i_1^2+i_2^2}{2}}$

(89) **(2).** Q-factor $=\frac{\omega_r L}{R}$

(90) **(2).** Emf $=(\vec{v}\times\vec{B}).\vec{L}$ (Here $\vec{L}=\overrightarrow{AB}+\overrightarrow{BC}=-a\hat{i}+a\hat{j}$)

$=[v\hat{i}\times B(-\hat{k})]\,[a(-\hat{i})+a\hat{j}]=vB\hat{j}.(-a\hat{i}+a\hat{j})=vBa$

(91) **(2).**



(92) **(1).** Convex mirror
Focal length = + f

$m=+\frac{1}{n}$ (virtual image) आभासी प्रतिबिम्ब

$m=\frac{f}{f-u}$; $\frac{1}{n}=\frac{f}{f-u}$

f – u = nf
f – nf = u
u = – (n – 1) f

(93) **(3).** $\tau=\frac{\tau_1\tau_2}{\tau_1+\tau_2}=\frac{1620\times660}{2280}=469$

$\frac{N}{4}=\frac{N}{2^{t/T}}$

$t=2T=2\tau\ln2=2\times0.693\times460=650$ years

(94) **(3).** $P = P_1 + P_2 \Rightarrow 10 = \frac{1}{f_1} + \frac{1}{f_2}$

$P = P_1 + P_2 - dP_1P_2$

$\Rightarrow 6.25 = \frac{1}{f_1} + \frac{1}{f_2} - \frac{20}{f_1f_2}$

On solving (3) option is obtained.

(95) **(2).** $n_1\lambda_1 = n_2\lambda_2$

$12 \times 600 = n_2 \times 400$

$n_2 = 18$

(96) **(4).** Pitch $= \frac{2mm}{8} = 0.25mm$; L.C. $= \frac{0.25mm}{250} = 0.001mm$

$\therefore$ Observed diameter = MSR + (Coinciding division × L.C.)
= (15 × 0.25 mm) + (100 × 0.001 mm)
= 3.75mm + 0.100mm = 3.850 mm

(97) **(1).** In CE mode,
Input current = I_B
Output current = I_C

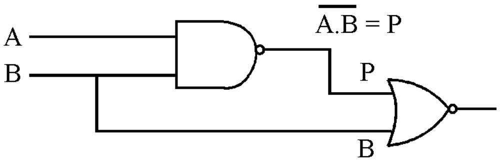
From $\beta = \frac{I_C}{I_B}$, $\frac{3.5mA}{I_B} = \frac{\alpha}{1-\alpha} = 49$

$\Rightarrow I_B = \frac{3.5mA}{49} = 0.071$ mA

(98) **(3).** $\overline{(\bar{A}+B).(A+\bar{B})} = \overline{(\bar{A}+B)} + \overline{(A+\bar{B})}$

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

(99) **(1).**



$Y = \overline{P+B} = \bar{P}.\bar{B} = \overline{\overline{A.B}}.\bar{B}$

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

(100) **(2).** $V_{CE} - I_CR_L - V_{CE} = 0$
$5 - (0.5 \times 10^{-3})(2 \times 10^3) - V_{CE} = 0$
$\Rightarrow V_{CE} = 4V$

(101) **(3).** 10% law of energy transfer in food chain was given by Lindeman.
खाद्य श्रृंखला में 10% ऊर्जा स्थानान्तरण का नियम लिन्डेमैन के द्वारा दिया गया था।

(102) **(1).** The law of limiting factor was proposed by Blackman.
'सीकाकारी कारक का नियम' ब्लैकमेन के द्वारा प्रस्तुत किया गया था।

(103) **(3).** In five kingdom classification of Whittaker eukaryotes were assigned to only four of the five kingdom. Prokaryotes are includes in kingdom-monera.

(104) **(4).** The present day calssification of living organisms is based on Anatomical and physiological characteristics

(105) **(4).** Lichens growing on rocks are called Saxicoles.

(106) **(1).** The symbiotic association of fungi and algae is called Lichen.

(107) **(1).** Mosses are indicator of air pollution.

(108) **(1).** Taneia saginata is also 'unarmed tapeworm' because the scolex does not possess hooks.

(109) **(3).** Soil, intestine, lung

(110) **(2).** Presence of antenna

(111) **(3).** Edible part of Banana are Endocarp and less developed mesocarp.

(112) **(1).** Number of stamens present in malvaceae is infinite.

(113) **(2).** In trees, the growth rings are represent in secondary xylem.

(114) **(3).** Annual rings are the bands of secondary xylem and xylem rays.

(115) **(2).** Multipolar nerve cells are present in dorsal root ganglia of spinal cord.

(116) **(3).**

(117) **(2).** Tissue connecting bones is Ligament.

(118) **(4).** The endoplasmic reticulum is present in Cytoplasm.

(119) **(3).** Cristae are found in wall of Mitochondria.

(120) **(3).** Lamellae of chloroplast are known as Thylakoids.

(121) **(2).** In DNA purine nitrogen bases are Guanine and Adenine.

(122) **(1).** Maltose e gives two molecules of glucose on hydrolysis.

(123) **(2).** When synapsis is complete all along the chromosome, the cell is said to have entered a stage called Pachytene.

(124) **(4).**

(125) **(1).** Centromere is required for movement of chromosomes towards poles.

(126) **(1).** Humus in soil is necessary for plant growth because it increases aeration and water absorption capacity of soil

(127) **(2).**

(128) **(3).** Water in plants is transported by ascent of sap takes place through xylem

(129) **(2).** Calcium is a constituent of cell walls in the form of calcium pectate. Calcium in small amounts is necessary for normal mitosis. Calcium may be involved in chromatin or mitotic spindle organization.
कैल्शियम, कैल्शियम पेक्टेट के रूप में कोशिका भित्ति का संघटक होता है। सामान्य समसूत्री विभाजन के लिये कैल्शियम की सूक्ष्म मात्र की आवश्यकता होती है। कैल्शियम क्रोमेटिन या समसूत्री तर्कु संगठन में सम्मिलता हो सकता है।

(130) **(1).** Manganese plays an important role in nitrate reduction. Manganese acts as an activator for the enzymes nitrite reductase and hydroxylamine reductase. The preference of ammonia over nitrate as a nitrogen source by the manganese - deficient cells supports the above mentioned analysis of the role of manganese
मैंग्नीज, नाइट्रेट अपचयन में महत्वपूर्ण भूमिका निभाता है। मैंग्नीज नाइट्राइट रिडक्टेज और हाइड्रोजायलेमाइन रिडक्टेज एन्जाइम के लिये सक्रियकारक की तरह कार्य करता है। मैंग्नीज की न्यूनता

वाली कोशिकाओं के द्वारा नाइट्रेट से ज्यादा अमोनिया को नाइट्रोजन के स्त्रोत के रूप में प्राथमिकता दी जाती है। इन कोशिकाओं के द्वारा ऊपर वर्णित मैग्नीशियम की भूमिका का समर्थन किया जाता है।

(131) **(4).** During photorespiration, the oxygen consuming reactions occur in stroma of chloroplasts and peroxisomes.

(132) **(1).**

(133) **(2).** In the leaves of C_4 plants, malic acid formation during CO_2 fixation occurs in the cells of Mesophyll.

(134) **(4).** 38 ATP are obtained at the end of Kreb's cycle.

(135) **(3).** Hydrolytic enzymes, which act on low pH are called as Hydrolases.

(136) **(1).** I.A.A. mainly inhibits growth of root.

(137) **(4).** Parthenocarpic tomato fruits can be produced by treating the plants with low concentrations of gibberellic acid and auxins.

(138) **(4).**

(139) **(2).**

(140) **(3).**

(141) **(3).** The process of breathing is controlled by respiratory centre located in the medulla oblongata.

(142) **(4).** During inspiration the diaphragm get flattered and ribs get raised.

(143) **(4).** Filter apparatus for dead R.B.C. is Liver + Spleen.

(144) **(3).** The 'Lubb' and "Dupp" heart sound are due to closing of heat valves.

(145) **(4).** Sulphates phosphates aod carbonates of calcium are excreted by Colon.

(146) **(2).**

(147) **(4).**

(148) **(3).** Bones of pelvic girdle forms a cavity in which head of the femur is fitted are ilium, ischium and pubis.

(149) **(2).** Muscle that bends one part over another is called Flexor.

(150) **(1).** The nodes of ranvier are the points in which the axons is exposed.

(151) **(3).**

(152) **(3).**

(153) **(3).** Melatonin is a hormone produced by Pineal gland

(154) **(3).** Adrenaline hormone causes increase in blood pressure, heart beat.

(155) **(3).** CCK-PZ stimulates contraction of gall bladder.

(156) **(1).** Parthenogenesis can be classified into arrhenotoky and thelytoky.

(157) **(2).** Incomplete or cyclic parthenogenesis is found in those animals in which both sexual reproduction and parthenogenesis occur.

(158) **(3).** Sperm penetrates through egg wall in most of the organisms by the help of sperm lysin formed from acrosome.

(159) **(3).** The main embryo developed from the structure formed as a result of Syngamy.

(160) **(1).**

(161) **(1).**

(162) **(2).** Oocyte is liberated from ovary under the influence of LH, after completing Meiosis I and before liberating second polar bodies.

(163) **(3).** Closed mitosis occurs during cleavage.

(164) **(3).** Eggs of birds are megalecithal.

(165) **(1).** Intra utrine device (Copper MIT) inhibit fertilization and help in birth control.

(166) **(3).** Surrogate mother is woman who bears a baby for another couple.

(167) **(1).** Anaphase divides the paired hereditary factors in to two equal and similar halves.

(168) **(2).** AABb × aaBb

	AB	Ab	AB	Ab
aB	AaBB	AaBb	AaBB	AaBb
ab	AaBb	Aabb	AaBb	Aabb
aB	AaBB	AaBb	AaBB	AaBb
ab	AaBb	Aabb	AaBb	Aabb

AaBB : AaBb: Aabb: aabb

4 : 8 : 4 : 0

AaBB = 1; AaBb = 2; Aabb = 1; aabb = 0

(169) **(1).**

Bbrr ×	bbRr
(Female)	(Male)
Pink spotted black Heterozygous	White not spotted

Gametes - Br, br   bR, br

♀ / ♂	bR	br
Br	BbRr Black unspotted	Bbrr Black pink spotted
br	bbRr White unspotted	bbrr White pink spotted

$\frac{1}{4}$ Black unspotted, $\frac{1}{4}$ Black pink spotted

$\frac{1}{4}$ White unspotted, $\frac{1}{4}$ White, pink spotted

Here B is dominant over band R is dominant over r.

(170) **(4).** The chromosome is formed by somatic pairs between homologous chromosomes and repeated replication or endomitosis of chromonemata.

(171) **(3).** For determination of nucleotide sequence of genes in virus.

(172) **(2).** After two divisions, four bacterial cells are formed in which two daughter bacterial cells have normal DNA and other two have both normal and heavy DNA because DNA replicates by semiconservative method in bacteria.

(173) **(1).** Proconsul was ancestor of man and ape.

(174) **(4).**

(175) **(3).** The first ancestor of man whose fossils have been discovered was Australopithecus.

(176) **(3).** The use of condoms has been shown to decrease the transmission AIDS because condoms is contraceptic.

निरोध के प्रयोग से एड्स का संचरण कम हो जाता है क्योंकि निरोध कोन्ट्रासेप्टिक होता है।

(177) **(1).** Fungal disease like mycosis and thrush can be controlled by using Bordaeux mixture (having copper sulphate).
कवकीय रोग जैसे – माइकोसिस तथा थ्रश को बोर्डेक्स मिश्रण (कॉपर सल्फेट युक्त) से नियन्त्रित किया जा सकता है।

(178) **(1).**

(179) **(1).**

(180) **(2).** First fermented acid is Lactic acid.

(181) **(3).** After Viral infection some substances are released by injected cells, these substances called as Interferon.

(182) **(3).** Shuttle vectors can replicate both in eukaryotic and Prokaryotic cells . e.g. YEp (Yeast episomal plasmid)

(183) **(3).** From a single DNA template molecule it is possible to generate 2^n DNA molecules after n number of cycles.

(184) **(2).**

(185) **(2).** Gut bacterium is E coil.

(186) **(2).**

(187) **(1).** In industries microorganisms are used for the manufacture of Gluconic acid.

(188) **(2).** he total water of land is known as Holard.

(189) **(1).** The depth of the lake at which sufficient amount of light penetrate is known as Limnetic zone.

(190) **(4).** Viviparous germination is found in Halophytes.

(191) **(1).** Planktons are those unicellular or multicellular organisms which passively float at or near the surface of water

(192) **(3).** Grass land with scattered trees are called Savana.

(193) **(3).** In an ecosystem the function of the producers is to trap solar energy and convert into chemical energy.

(194) **(3).** Preservation at –196°C (liq. N_2) can maintain tissue culture, embryos, animal cells/tissues, spermatozoa, etc. is called as cryopreservation. It is an ex-situ, conservation method i.e. conservation of organism outside their natural homes other ex-situ conservation methods are - off site collection and genebanks.

(195) **(1).**

(196) **(3).** The wildlife is protected in their natural habitat. This is called as in-situ conservation. But when wild life is allowed to develop under protection, in areas, than natural habitats such as zoos, botanical gardens etc. This is called as ex-situ conservation.

(197) **(4).** Decrease in rate of mitosis in root tips is caused by Lead.

(198) **(1).** Water pollution can be stopped best by treating effluents to remove injurious chemicals.

(199) **(3).** O group is universal donor; Rh^+ blood can be given to a Rh^- person only once, so O Rh^- is safer.

(200) **(1).** The two mendelian factors which occur on the same locus in the two homologous chromosomes of an individual and control the expression of a trait or character are called alleles or allelomorphs.