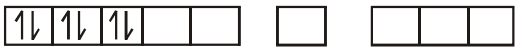
HINTS & SOLUTIONS (संकेत एवं हल)

PART -A
CHEMISTRY

1. Co^{3+}



2. NH_2 — NH_2 , OCN^-, N_3^- are monodentate ligand where as dmg^{-1} is bidentate ligand and OCN^- is a ambidentate also.

NH_2 — NH_2 , OCN^-, N_3^- एकल दंतुक लिगेण्ड है जबकि dmg^{-1} द्विदंतुक लिगेण्ड है तथा OCN^- एक उभयदंतुक लिगेण्ड भी है।

3. $[Fe(I)(H_2O)_5NO^+]^{2+}SO_4^{2-}$

4. Primary valency = oxidation no. of central atom = 3.
This compound contains Cl^- and $C_2O_4^{2-}$ as ligand Cl^- is a unidented ligand and $C_2O_4^{2-}$ is a bidented ligand. So, secondary valency = 6

प्राथमिक संयोजकता = केन्द्रीय परमाणु के लिये ऑक्सीकरण संख्या = 3

इस यौगिक में Cl^- तथा $C_2O_4^{2-}$ लिगेण्ड के रूप में उपस्थित है। Cl^- एक एकलदन्तुक लिगेण्ड है, जबकि $C_2O_4^{2-}$ एक द्विदन्तुक लिगेण्ड है। इसलिए द्वितीयक संयोजकता = 6

5. $K_2[PtCl_6]$; Platinum is in + 4 oxidation state. Atomic number of Pt = 78.

$K_2[PtCl_6]$; प्लैटिनम + 4 ऑक्सीकरण अवस्था में है, Pt का परमाणु क्रमांक = 78.

So EAN Pt(IV) = 78 – 4 + 12 = 86

6. (a) $CoCl_3\ 6NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_6]^{3+} + 3Cl^-$ (no. of ions = 4 & total electrical charges = 6)

(b) $CoCl_3.5NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_5\ Cl]^{2+} + 2Cl^-$ (no. of ions = 3 & total electrical charges = 4)

(c) $CoCl_3.4NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_4\ Cl_2]^+ + Cl^-$ (no. of ions = 2 & total electrical charges = 2)

(d) $CoCl_3.3NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_3\ Cl_3]$ (neutral solution). It will not conduct electricity.

(a) $CoCl_3\ 6NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_6]^{3+} + 3Cl^-$ (आयनों की संख्या = 4 व कुल विद्युत आवेश = 6)

(b) $CoCl_3.5NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_5\ Cl]^{2+} + 2Cl^-$ (आयनों की संख्या = 3 व कुल विद्युत आवेश = 4)

(c) $CoCl_3.4NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_4\ Cl_2]^+ + Cl^-$ (आयनों की संख्या = 2 व कुल विद्युत आवेश = 2)

(d) $CoCl_3.3NH_3 \overset{aq.}{\rightleftharpoons} [Co(NH_3)_3\ Cl_3]$ (उदासीन विलयन) यह विद्युत धारा का चालन नहीं करेगा।

7. $2K^+[Cr(\overset{-2}{C}N)_2\ \overset{-2}{O}_2(\overset{-4}{O})_2(\overset{0}{N}H_3)]^{2-}$

Oxidation state of chromium = x + 2(– 1) + (– 2) + 2(– 2) + (0) = – 2.

$\therefore$ x = + 6.

As per IUPAC name.

Complex is anionic, so metal ion will be named as chromate with +6 oxidation state. So, potassium amminedicyanodioxoperoxochromate(VI).

$2K^+[Cr(\overset{-2}{C}N)_2\ \overset{-2}{O}_2(\overset{-4}{O})_2(\overset{0}{N}H_3)]^{2-}$

क्रोमियम की ऑक्सीकरण अवस्था = x + 2(– 1) + (– 2) + 2(– 2) + (0) = – 2.

$\therefore$ x = + 6.

इस प्रकार IUPAC नाम

संकुल ऋणायनिक है इसलिए +6 ऑक्सीकरण अवस्था के साथ धातु आयन का नाम क्रोमेट होगा। अतः, पोटैशियम एम्मीनडाइसायनोडाइऑक्सोपरऑक्सोक्रोमेट(VI).

8. $pH = \frac{1}{2}(P^kw + P^ka + \log C)$.

9. pH = 10 $\Rightarrow$ $[H^+] = 10^{-8}$ M

$\Rightarrow$ $[OH^-] = 10^{-6}$ M.

Number of ions $[OH^-]$ in 100 ml = $10^{-6} \times 100 \times 10^{-3} \times N_A = 10^{-7} \times 6.023 \times 10^{23} = 6.023 \times 10^{16}$.

100 ml में आयन $[OH^-]$ की संख्या

$= 10^{-4} \times 100 \times 10^{-3} \times N_A = 10^{-5} \times 6.023 \times 10^{23}$

$= 6.023 \times 10^{18}$.

10. (3) (ii) < (i) < (iii) < (iv) (4) (iv) < (iii) < (ii) < (i)

11. (2) $CH_3COOH + HF + \rightleftharpoons CH_3COOH_2^+ F^-$.

HF gives H^+ to the CH_3COOH & forms F^-. So it is a conjugate base of HF.

HF, CH_3COOH को H^+ आयन देता है। इसलिए यह HF का संयुग्मी क्षार है।

12. Relative strength of weak acids (दुर्बल अम्ल की आपेक्षिक सामर्थ्यता)

$$= \sqrt{\left(\frac{K_{a_1}}{K_{a_2}} \times \frac{C_1}{C_2}\right)}$$

$\therefore$ Relative strength (आपेक्षिक सामर्थ्यता) = $\sqrt{\left(\frac{K_{a_1}}{K_{a_2}}\right)}$

($\because C_1 = C_2$) $= \sqrt{\left(\frac{2\times10^{-4}}{2\times10^{-5}}\right)}$

Relative strength for HCOOH to CH_3COOH = $\sqrt{10}:1$

HCOOH से CH_3COOH की आपेक्षिक सामर्थ्यता $= \sqrt{10}:1$

15. α is negligible w.r.t 1 so $k_a = c\alpha^2$

1 के सन्दर्भ में α नगण्य है, अतः $k_a = c\alpha^2$

$k_a = 0.1 \times (0.01)^2 = 10^{-5}$

$ka = 10^{-5}$

$p^{ka} = 5$

16. $\frac{1}{2}$ (pKw + pKa + log C)

$= \frac{1}{2}(14 + 6 - 1) = 9.5$

17. $N_R = [OH^-] = \frac{100\times0.150 - 200\times0.03\times2}{300} = 10^{-2}$

pOH = 2 pH = 14 – 2 = 12

19. Only the ionic product of CuS exceeds its K_{sp} and hence, it is precipitated only.

केवल CuS का आयनिक गुणनफल उसके K_{sp} से अधिक होता है अतः केवल यह ही अवक्षेपित होता है।

20. $K_{SP}(MX) \Rightarrow S^2 = 4 \times 10^{-8}$

$\Rightarrow S = 2 \times 10^{-4}$

$K_{SP}(MX_2) \Rightarrow 4S^3 = 3.2 \times 10^{-14} \Rightarrow S = 2 \times 10^{-5}$

$K_{SP}(M_3X) \Rightarrow 8S^4 = 2.7 \times 10^{-15} \Rightarrow S = \sqrt{\frac{27}{8}} \times 10^{-4}$

So solubility order will be $MX > M_3X > MX_2$.

इसलिए विलेयता क्रम $MX > M_3X > MX_2$ होगा।

21. $pH = -\log Ka + \log\frac{(Salt)}{(Acid)} \Rightarrow x = -\log Ka + \log\frac{(Salt)}{(Acid)}$ If conc. of Acid is doubled then new

$pH = -\log Ka + \log\frac{(Salt)}{2\ (Acid)}$

$= \left[-\log\ Ka + \log\frac{(Salt)}{(Acid)}\right] - \log\ 2$

$= x - 0.301$

$\therefore$ decreased by 0.3

$pH = -\log Ka + \log\frac{(\text{लवण})}{(\text{अम्ल})} \Rightarrow x = -\log Ka + \log\frac{(\text{लवण})}{(\text{अम्ल})}$ यदि अम्ल की सान्द्रता दुगुनी कर दें, तो

नयी $pH = -\log Ka + \log\frac{\text{लवण}}{2\text{अम्ल}}$

$= \left[-\log\ Ka + \log\frac{(Salt)}{(Acid)}\right] - \log\ 2$

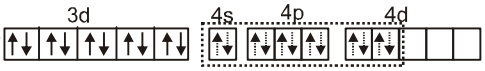
$= x - 0.301$

0.3 से घट जायेगी।

22. I.P. $\geq K_{sp}$ $[Mg^{2+}][OH^-] \geq 10^{-11}$

$[OH^-]^2 \geq 10^{-10}$ $[OH^-] \geq 10^{-5}$

$P^{OH} \leq 5$ $P^H \geq 9$

23. $[Zn(NH_3)_6]^{2+}$ 

sp^3d^2 hybridization

Outer orbital complex because it involves nd orbitals in the hybridisation.

बाह्य कक्षीय सकूंल है क्योंकि इसके संकरण में nd कक्षके सम्मिलित है।

26. $[Cr\ Cl_2\ (H_2O)_4]\ Cl.2H_2O$ will liberate $\frac{1}{3}$ of the total chloride ions for precipitation.

27. $[Mn(CN)_6]^{3-}$: d^2sp^3 hybridised $Mn^{3+} = 3d^4\ 4s^o = t_{2g}^{2,\ 1,\ 1}\ eg^{oo}$ = no. of unpaired electrons = 2

magnetic moment = $\mu_B = \sqrt{2\times4}$ BM $\simeq$ 2.8 BM

$[MnBr_4]^{2-}$: $Mn^{2+} = 3d^5\ 4s^o = eg^{1,1}\ t_{2g}^{1,1,1} = sp^3$ hybridised no. of unpaired electrons = 5

magnetic moment = $\mu_B = \sqrt{5\times7}$ BM $\simeq$ 5.9 BM

$[Mn(CN)_6]^{3-}$: $Mn^{3+} = 3d^4\ 4s^o = t_{2g}^{2,1,1}\ eg^{oo}$ = d^2sp^3 संकरित, अयुग्मित e^- की संख्या = 2

चुम्बकीय आघूर्ण = $\mu_B = \sqrt{2\times4}$ BM $\simeq$ 2.8 BM

$[MnBr_4]^{2-}$: $Mn^{2+} = 3d^5\ 4s^o = eg^{1,1}\ t_{2g}^{1,1,1} = sp^3$ संकरित, अयुग्मित e^- की संख्या = 5

चुम्बकीय आघूर्ण = $\mu_B = \sqrt{5\times7}$ BM $\simeq$ 5.9 BM

PART - B
PHYSICS

48. $x = d_1\left[1-\frac{1}{\mu_1}\right]+d_2\left[1-\frac{1}{\mu_2}\right]+d_3\left[1-\frac{1}{\mu_3}\right]$

$=6\left[1-\frac{1}{1.5}\right]+7\left[1-\frac{1}{1.4}\right]+8\left[1-\frac{1}{4/3}\right]=6$ cm.

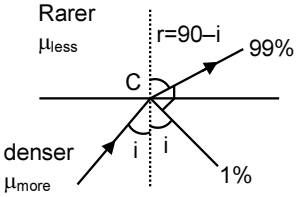
49. i = θ, r = 2θ

$\mu\sin\theta = (1)\sin 2\theta \Rightarrow \quad \mu\sin\theta = (1)\,2\sin\theta\cos\theta$

$\cos\theta = \frac{\mu}{2} \quad \Rightarrow \quad \theta = \cos^{-1}\left(\frac{\mu}{2}\right)$

$r = 2\theta = 2\cos^{-1}\left(\frac{\mu}{2}\right)$

50. Applying snell's rule between incident and refracted rays :



$\mu_{more}\sin i = \mu_{less}\sin(90-i)$

where $\sin(90-i) = \cos i$

$\frac{\mu_{less}}{\mu_{more}} = \frac{\sin i'}{\sin i} = \tan i$

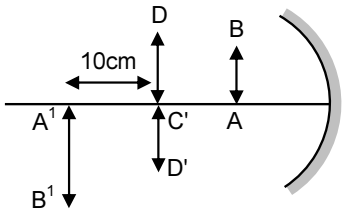
$i_c = \sin^{-1}\left(\frac{n_{less}}{n_{more}}\right) = \sin^{-1}(\tan i)$

Note : The angle of incidence for which reflected and refracted beam become mutually perpendicular, is called "Brewster Angle".

51. The mage distance for object AB

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

$\Rightarrow$ v = –30 m



Total perimeter of the image
= 2 + 4 + 10 = 16 cm

52. D = 360° – 2θ

240° = 360° – 2θ

2θ = 120° $\quad \therefore\ \theta = 60°$

Then, number of images observable,

$N = \frac{360°}{60°}-1 = 6-1 = 5$

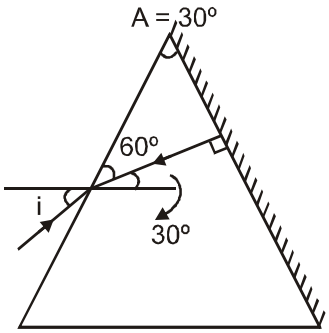
54. Since i = e so it is the case of minimum deviation.

$i_m = \frac{3}{4}A \quad \Rightarrow \quad \frac{\delta_{min}+A}{2} = \frac{3}{4}A$

$\delta_{min} = \frac{A}{2} = \frac{60}{2} = 30$

$n = \frac{\sin\left(\frac{\delta_{min}+A}{2}\right)}{\sin\left(\frac{A}{2}\right)} = \frac{\sin\left(\frac{30°+60°}{2}\right)}{\sin\left(\frac{60}{2}\right)} = \frac{1/\sqrt{2}}{1/2} = \sqrt{2}$

55.



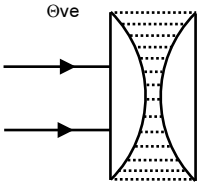
$\frac{\sin i}{\sin 30°} = \sqrt{2} \Rightarrow \quad \sin i = \sqrt{2}\times\frac{1}{2} = \frac{1}{\sqrt{2}}$

$\Rightarrow$ i = 45° .

56. $\frac{1}{f} = \left(\frac{n_\ell}{n_m}-1\right)\left(\frac{1}{R_1}=\frac{1}{R_2}\right)$

$\frac{1}{f_1} = \left(\frac{3/2}{1}-1\right)\left(\frac{1}{\infty}-\frac{1}{20}\right)$

$\Rightarrow$ f_1 = + 40 cm, similarly f_2 = + 40 cm.



$$\frac{1}{f_3}=\left(\frac{1.7}{1}-1\right)\left(\frac{1}{-20}+\frac{1}{+20}\right)\Rightarrow \frac{1}{f_3}=-\frac{100}{7}\text{cm}$$

$$\frac{1}{f_{eq}}=\frac{1}{f_1}+\frac{1}{f_2}+\frac{1}{f_3}$$

$$\frac{1}{f_{eq}}=\frac{1}{+40}+\frac{1}{-100/7}+\frac{1}{+40}$$

$f_{eq} = -50$ cm

57. $E = E_0 \sin 12 \times 10^6 (z - 2 \times 10^8 t)$

So $c = 2 \times 10^8$

$$c=\frac{c_0}{n} \quad \Rightarrow 2\times10^8=\frac{3\times10^8}{n} \Rightarrow n=\frac{3}{2}$$

58. apparent depth $= \dfrac{\text{read depth}}{\mu}$

$$9=\frac{12}{\mu} \quad \Rightarrow \quad \mu=\frac{4}{3}$$

In the second case,

Apparent depth $= \dfrac{12}{1.5}=6\,\text{cm}$,

So the focus has to be shifted 9 – 6 = 3 cm upwards.

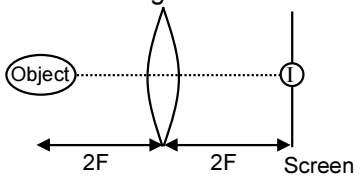
59. We have to cover the circle of illuminance whose radius will be :-

$$R=\frac{h}{\sqrt{n^2-1}}=\frac{1}{\sqrt{\left(\frac{4}{3}\right)^2-1}}=\frac{3}{\sqrt{7}}\text{m}$$

Area of that circle

$$= \pi R^2=\frac{22}{7}\times\frac{9}{7}=\frac{198}{49}\approx\frac{200}{50}=4\text{m}^2$$

60. The minimum distance between the real object and real image for convex lens = 4f



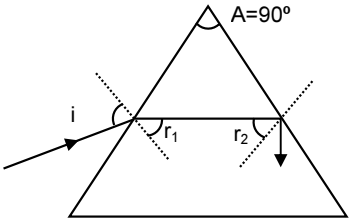
$d \geq 4f$

$$f\leq\frac{d}{4} \quad \Rightarrow \quad f\leq\frac{3m}{4}\Rightarrow \quad f\leq 0.75\text{ m}$$

$F_{max} = 0.75$ m

61. For TIR

$r_2 > i_c$ where $i_c=\sin^{-1}\left(\dfrac{1}{5/4}\right)=53^\circ$



so $r_2 = (53^\circ)^+$

Since $r_1 = A - r_2 \quad \Rightarrow r_1 = 90^\circ - (53^\circ)^+$

$\Rightarrow r_1 = (37^\circ)^-$

For incident and reflected ray

(i) $\sin i=\dfrac{5}{4}\sin r_1$

$$\sin i=\frac{5}{4}\sin(37^\circ)^-=\left(\frac{5}{4}\right)\left(\frac{3}{5}\right)^-$$

$$\sin i=\left(\frac{3}{4}\right)^- \quad \Rightarrow \quad i=\sin^{-1}\left(\frac{3}{4}\right)^-$$

$$\text{so } i<\sin^{-1}\left(\frac{3}{4}\right)$$

62. Net power of the cornea + eye-lens system to observe the object at infinity.

$P_{eq} = P_1 + P_2 = +40\text{ D} + 20\text{ D} = +60\text{ D}$

$$f_{eq}=\frac{1}{P_{eq}}=\frac{1}{60}\text{m}=\frac{100}{60}\text{cm}=\frac{5}{3}\text{cm}$$

In this case the object is at infinity, so the image will form at equivalent focus $\Rightarrow$ distance between eye lens and retina $= \dfrac{5}{3}\text{cm}$

63. In the previous question, we have found out the distance between the eye-lens and the retina is $\dfrac{5}{3}\text{cm}$. To see the nearest object (25 cm) the equivalent focal length required :

$$\Rightarrow \frac{1}{v}-\frac{1}{u}=\frac{1}{f_{eq}} \quad \Rightarrow \quad \frac{1}{+5/3}-\frac{1}{-25}=\frac{1}{f_{eq}}$$

$$\Rightarrow f_{eq}=\frac{25}{16}\text{cm}=\frac{25}{16\times100}\text{m}=\frac{1}{64}\text{m}$$

$$\Rightarrow P_{eq}=\frac{1}{f_{eq}}=+64\text{D}\Rightarrow \quad P_{eq}=P_{cornea}+P_{eye\text{-}lens}$$

$\Rightarrow 64 = 40 + P_{eye\text{-}lens}$

$P_{eye\text{-}lens} = 24$ D, so to see the nearest as well as farthest object $P_{eye\text{-}lens} \in$ (+20 D to + 24 D)

64. $\delta_{net} = (n_{y1} - 1) A_1 - (n_{y2} - 1) A_2 = 0$

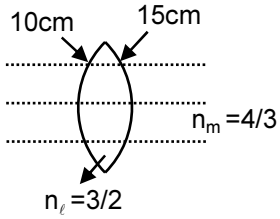
$\Rightarrow (1.52 - 1) 8^\circ = (1.64 - 1) A_2 \Rightarrow A_2 = 6.5^\circ$

65. $Q_{net} = (n_{v1} - n_{r1}) A_1 = (n_{v2} - n_{r2}) A_2 = 0$

$(1.53 - 1.51) 8 = (1.66 - 1.62) A_2 \Rightarrow A_2 = 4^\circ$

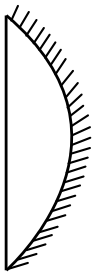
66. $\dfrac{1}{f}=\left(\dfrac{n_\ell}{n_m}-1\right)\left(\dfrac{1}{R_1}-\dfrac{1}{R_2}\right)$

$$\frac{1}{f}=\left(\frac{3/2}{4/3}-1\right)\left(\frac{1}{+10}-\frac{1}{-15}\right)$$



f = + 48 cm

68. $F_n = -\frac{30}{2} = -15$



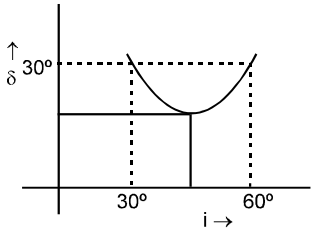
$$\frac{1}{f_\ell}=\left(\frac{1.5}{1}-1\right)\left(\frac{1}{\infty}-\frac{1}{-30}\right)\Rightarrow F_\ell = 60 \text{ cm}$$

$$\Rightarrow \frac{1}{f_{eq}}=\frac{1}{f_m}-\frac{2}{f_\ell} \quad \Rightarrow \quad \frac{1}{f_{eq}}=\frac{1}{-15}-\frac{2}{30}$$

$\Rightarrow f_{eq} = -10$ cm

So that distance of the object should be $2f_{eq} = 20$ cm

69.



From the graph ;

$\delta = i + e - A$.

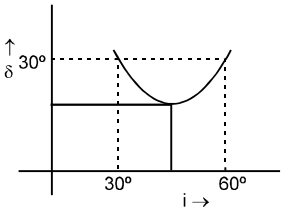
$30° = 30° + 60° - A$

$\therefore A = 60°$

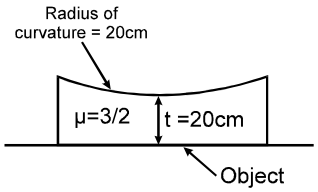
(use the result : If i and e are interchanged then we get same value of δ)

$$n=\frac{\sin\left(\frac{\delta_{min}+A}{2}\right)}{\sin\left(\frac{A}{2}\right)} \Rightarrow 1.28=\frac{\sin\left(\frac{\delta_{min}+60°}{2}\right)}{\sin\left(\frac{60°}{2}\right)}$$

$\Rightarrow \delta_{min} = 20°$



70.



Considering refraction at the curved surface,

$u = -20$; $\mu_2 = 1$

$\mu_1 = 3/2$; $R = +20$

applying $\frac{\mu_2}{v}-\frac{\mu_1}{u}=\frac{\mu_2-\mu_1}{R}$

$$\Rightarrow \frac{1}{v}-\frac{3/2}{-20}=\frac{1-3/2}{20} \Rightarrow \quad v = -10$$

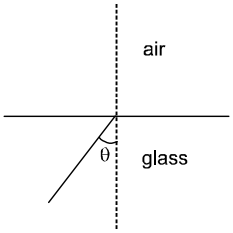
i.e. 10 cm below the curved surface or 10 cm above the actual position of flower.

71. As the beam just suffers TIR at interface of region III and IV.

$$n_0 \sin\theta = \frac{n_0}{2}\sin\theta_1 = \frac{n_0}{6}\sin\theta_2 = \frac{n_0}{8}\sin 90°$$

$$\sin\theta = \frac{1}{8} \Rightarrow \quad \theta = \sin^{-1}$$

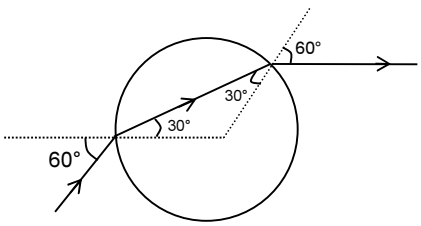
72.



Initially most of part will be transmitted. When $\theta > i_C$, all the light rays will be total internal reflected. So transmitted intensity = 0

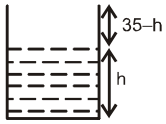
So correct answer is (C)

74.



$S_{net} = S_1 + S_2 = 30° + 30° = 60°$ clockwise

76.



For appearing to filled half
height of empty part = Apparent depth of filled part

$35 - h = \dfrac{h}{4/3} \quad \Rightarrow \quad$ get h = 20 cm

77. Lateral displacement = t sec r sin (i – r)
= (4 cm) sec (45º) sin (60º – 45º)
= $4\sqrt{2}$ (sin 60º cos 45º – cos 60º sin 45º)
= $2(\sqrt{3}-1)$ cm

80. $\dfrac{1}{V}-\dfrac{1}{4}=\dfrac{1}{f} \quad \dfrac{1}{25}-\dfrac{1}{50}=\dfrac{1}{f}$

f = 50 cm $\Rightarrow$ P = 1/f = + 2D

81. $\dfrac{1}{v}-\dfrac{1}{u}=\dfrac{1}{f} \Rightarrow \quad \dfrac{1}{-4m}-\dfrac{1}{\infty}=\dfrac{1}{f}$

$\Rightarrow$ f = – 4m $\Rightarrow$ power = $\dfrac{1}{f} = \dfrac{1}{-4}$ = – 0.25D

83. The rays from object will be first refracted from the first lens.

$\dfrac{1}{V}-\dfrac{1}{u}=\dfrac{1}{f} \Rightarrow \dfrac{1}{V}-\dfrac{1}{-30}=\dfrac{1}{+10} \Rightarrow$ V = 15 cm

This image will act like an object for second concave lens. After second refraction, the rays will be parallel and after 3rd refraction the final image will from at the focus of 3rd lens.

85. $\omega = \left(\dfrac{1.62-1.42}{1.5-1}\right) = \dfrac{0.2}{0.5} = \dfrac{4}{10} = 0.4$

86. Focal length of the lens remains same. Intensity of image formed by lens is proportional to area exposed to incident light from object.

i.e., $\dfrac{I_2}{I_1}=\dfrac{A_2}{A_1}$

Initial area, $A_1 = \left(\dfrac{d}{2}\right)^2 = \dfrac{\pi d^2}{4}$

After blocking exposed area

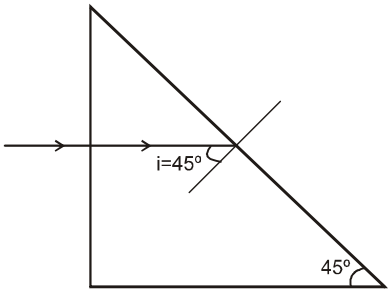
$A_2 = \dfrac{\pi d^2}{4}-\dfrac{\pi(d/2)^2}{4} = \dfrac{\pi d^2}{4}-\dfrac{\pi d^2}{16} = \dfrac{3\pi d^2}{16}$

$\therefore \quad \dfrac{I_2}{I_1}=\dfrac{A_2}{A_1}=\dfrac{\frac{3\pi d^2}{16}}{\frac{\pi d^2}{16}}=\dfrac{3}{4}$

or $I_2 = \dfrac{3}{4}I_1 = \dfrac{3}{4}I \quad (\because \quad I_2 = I)$

Hence focal length of a lens = f_1 intensity of the image =

87.

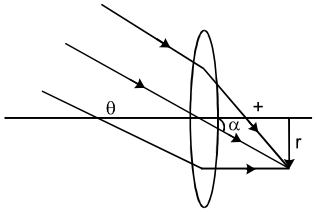


For TIR $\quad i > i_c \quad$ so sin i > sin i_c

sin 45º > $\dfrac{1}{\mu} \Rightarrow \mu > \sqrt{2} \quad \Rightarrow \quad \mu > 1.414$

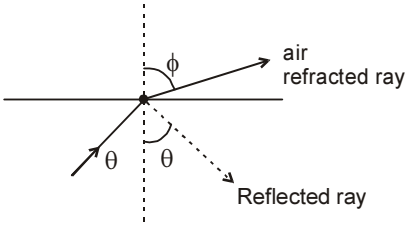
Since μ of green and voilet are greater than 1.414 so they will total internal refrected. But red colour will be vetracted
So Ans. is (3)

88. r = f tanα

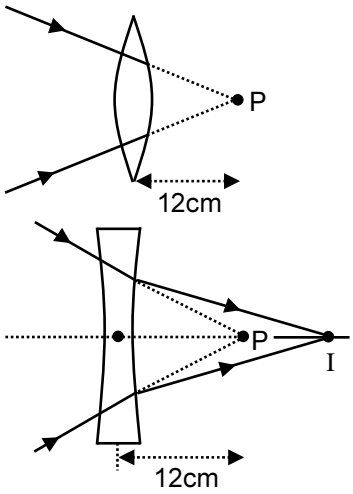


Hence, $\quad \pi r^2 \propto f^2$.

89. There will be partial reflection and refraction as shown in figure.
Angle between the reflected ray and the refracted ray = 180 – (θ + ϕ) which is less than 180 – 2θ (because $\phi > \theta$)



90. Here, the point P on the right of the lens acts as a virtual object,



$\therefore$ u = 12 cm, v = ?

(a) f = 20 cm $\because \frac{1}{v}-\frac{1}{u}=\frac{1}{f}$ $\therefore$ $\frac{1}{v}-\frac{1}{12}=\frac{1}{20}$

$\Rightarrow$ $\frac{1}{v}=\frac{1}{20}+\frac{1}{12}=\frac{3+5}{60}=\frac{8}{60}$

$\Rightarrow$ $v=\frac{60}{8}=7.5\text{cm}$

(b) f = – 16 cm, u = 12 cm,

$\therefore$ $\frac{1}{v}=\frac{1}{f}+\frac{1}{u}=\frac{1}{-16}+\frac{1}{12}=\frac{3+4}{48}=\frac{1}{48}$

$\Rightarrow$ v = 48 cm

Hence image is formed 48 cm to the right of the lens, where the beam would converge.

PART–C
BIOLOGY

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93. NCERT XII Page 71
94. NCERT XII PAGE 71
95. NCERT XII PAGE 75
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98. NCERT XII Page 72
99. NCERT XII Page 88
100. NCERT XII Page 84
101. NCERT XII Page 83
102. NCERT XII Page 71
103. NCERT XII Page 77
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106. NCERT XII Page 80
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108. NCERT XII Page 75
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110. NCERT XII Page 77, 78
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115. NCERT XII Page 79
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PART TEST-2 (PT-2)

PATTERN: NEET

TARGET: NEET/AIIMS-2019

DATE : 30-09-2018

COURSE : SAFAL (MR02/MR02RH1)

ANSWER KEY

CODE-4

PART –A

CHEMISTRY

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

PART - B

PHYSICS

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

PART - C

BIOLOGY

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