2082-10-10 Hints & Solution

Section – I

1.(d) $R = \frac{2u_xu_y}{g} = \frac{2 \times 5 \times 4}{10} = 4\text{m}$

2.(a) Energy density $= \frac{1}{2} \times \text{Stress} \times \text{Strain}$

$= \frac{1}{2} \times (Y \times \text{Strain}) \times \text{Strain}$

$= \frac{1}{2} Y\alpha^2$

3.(d) $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$

or, $\frac{1}{\frac{\rho_{eq} l}{2A}} = \frac{l}{\rho_1 \frac{l}{A}} + \frac{l}{\rho_2 \frac{l}{A}}$

or, $\frac{2}{\rho_{eq}} = \frac{1}{\rho_1} + \frac{1}{\rho_2}$

or, $\rho_{eq} = \frac{2\rho_1\rho_2}{\rho_1 + \rho_2}$

4.(c) $\beta = \frac{\alpha}{1-\alpha} = \frac{0.9}{1-0.9} = 9$

5.(d) $\frac{R}{R_{Fe}} = \left(\frac{A}{56}\right)^{1/3}$ $\{\because R \propto A^{1/3}\}$

or, $\frac{\frac{1}{2}R_{Fe}}{R_{Fe}} = \left\{\frac{A}{56}\right\}^{1/3}$ $\left\{\because R = \frac{1}{2}R_{Fe}\right\}$

or, $\frac{1}{8} = \frac{A}{56}$

or, $A = 7$

6.(b) $F_{medium} = \frac{\mu_r \mu_0 I_1 I_2}{2\pi r}$

$= \mu_r \times F_{vacuum}$

$= 10 \times 2 \times 10^{-7}$

$= 2 \times 10^{-6}$ N/m

7.(c) K.E. per molecule $= \frac{3}{2}$KT; T = constant.

8.(d) For 1st overtone

$\frac{\lambda}{2} + \frac{\lambda}{2} = l$ or, $\lambda = l$

9.(c) Induced charge $= \frac{\Delta\phi}{R}$; $\Delta\phi$ = change of flux

R = resistance

10.(c) $y = \frac{1}{2}\frac{qE}{m}\frac{x^2}{v^2}$

or, $y = \frac{qEx^2}{4KE}\left(\because KE = \frac{1}{2}mv^2\right)$

i.e. $y \propto q$ (change)

Charge of α > change of proton = change of electron.

11.(b) The potential inside conductor is same as that on surface as inside conductor is equipotential surface.

12.(b) At height h,

P.E $= \frac{1}{3}$ K.E

$\Rightarrow$ K.E = 3P.E

$\therefore$ Total energy (E) = K.E + P.E = 4P.E

Now, 4P.E $= \frac{1}{2}mu^2 \left(\because \frac{1}{2}mu^2 \text{ is initial total energy}\right)$

or, $4 \times mgh = \frac{1}{2}mu^2$ or, $h = \frac{u^2}{8g}$

13.(a) P = IV

$= \frac{ne}{t} \times v$

14.(c) $I = I_0\cos^2\theta$

or, 25% of $I_0 = I_0\cos^2\theta$

or, $\cos\theta = \frac{1}{2}$

$\therefore$ $\theta = 60$

15.(c)	**16.(b)**	**17.(b)**	**18.(a)**	**19.(b)**
20.(a)	**21.(b)**	**22.(c)**	**23.(b)**	**24.(b)**
25.(c)	**26.(d)**	**27.(d)**	**28.(b)**	

29.(c) We have $p \Rightarrow q \equiv (\sim q) \Rightarrow (\sim p)$
So the equivalent statement must be if mobile works well then battery is not low.

30.(b) $A - (A - B) = A \cap (A - B)' = A \cap (A \cap B')' = A \cap (A' \cup (B')') = A \cap (A' \cup B)$
$= (A \cap A') \cup (A \cap B) = A \cap B$

31.(c) One root $= -2 + \sqrt{3}$
As the irrational roots always occur in conjugate pair.
So other root must be $-2 - \sqrt{3}$.

32.(d) For equal roots, we must have, discriminant = 0

$\Rightarrow$ $(k + 2)^2 - 4 \times 1.2k = 0$

$\Rightarrow$ $k^2 + 4k + 4 - 8k = 0$

$\Rightarrow$ $k^2 - 4k + 4 = 0$

$\Rightarrow$ $(k - 2)^2 = 0$

$\Rightarrow$ $k = 2$

33.(a) Here lines are parallel and have no point of intersection.

34.(c) Here the lines x = 0 and y = 0 are perpendicular to each other. Hence the orthocentre = (0, 0)

35.(b) Given $x^2 + y^2 = 0$ which is true only when
$x^2 = 0, y^2 = 0$ i.e., x = 0, y = 0. So a point

36.(c) Using fact that, product of parameters = –1 at the end of focal chord.

37.(d) Given parabola is $y^2 = 2x$

Here $a = \frac{1}{2}$

and the line is $y = 2x + \lambda$.

So m = 2, c = λ

The line touches the parabola if

$\lambda = am = \frac{1}{2} \times 2 = 1$

38.(a) Distance from y-axis $= \sqrt{x^2 + z^2} = \sqrt{16 + 25} = \sqrt{41}$ units.

39.(c) $\sqrt{6^2 + (-2)^2 + 3^2} = \sqrt{36 + 4 + 9} = \sqrt{49} = 7$

So the direction cosines of a normal are

$\frac{6}{7}, -\frac{2}{7}, \frac{3}{7}$

40.(d) Given $|\vec{a}| = 1$, $|\vec{b}| = 1$, $|\vec{a} + \vec{b}| = 1$, angle between $\vec{a}$ & $\vec{b} = \alpha$

Now, $|\vec{a} + \vec{b}|^2 = 1$

or, $|\vec{a}|^2 + |\vec{b}|^2 + 2\vec{a}.\vec{b} = 1$

or, $1 + 1 + 2|\vec{a}|\,|\vec{b}|\cos\alpha = 1$

or, $2.1.1 \cos\alpha = -1$

or, $\cos\alpha = -\frac{1}{2}$ $\therefore \alpha = 120°$

2082-10-10 Hints & Solution

41.(c) $\sec^{-1}x = \text{cosec}^{-1}y$

or, $\cos^{-1}\frac{1}{x} = \sin^{-1}\frac{1}{y}$

or, $\cos^{-1}\frac{1}{x} = \frac{\pi}{2} - \cos^{-1}\frac{1}{y}$

$\therefore$ $\cos^{-1}\frac{1}{x} + \cos^{-1}\frac{1}{y} = \frac{\pi}{2}$

42.(d) $P(A\cup B) = P(A) + P(B) - P(A\cap B)$

$= 0.4 + 0.5 - 0.12 = 0.78$

$P(\overline{A\cup B}) = 1 - P(A\cup B) = 1 - 0.78 = 0.22$

$P(\overline{B}) = 1 - P(B) = 1 - 0.5 = 0.5$

$\therefore$ $P(\overline{A}/\overline{B}) = \frac{P(\overline{A}\cap\overline{B})}{P(\overline{B})} = \frac{P(\overline{A\cup B})}{P(\overline{B})} = \frac{0.22}{0.5} = 0.44$

43.(b) Given $\sigma_x = 20$ $\sigma_y = 15$ $r = 0.48$

$\therefore$ Regression coefficient of x on y $b_{xy} = r\frac{\sigma_x}{\sigma_y}$

$= 0.48 \times \frac{20}{15} = 0.64$

44.(c) Given $\lim_{x\to 0}\frac{\tan 2x - x}{3x - \sin x} = \lim_{x\to 0}\frac{\frac{\tan 2x}{2x}\times 2 - 1}{3 - \frac{\sin x}{3}}$

$= \frac{2-1}{3-1} = \frac{1}{2}$

45.(c) Since the function is continuous at x = 0.

So we have $\lim_{x\to 0} f(x) = f(0)$

or, $\lim_{x\to 0} x\sin\frac{1}{x} = k$ $\therefore$ $k = 0$

46.(d) Given $y = x + \frac{x^2}{2} + \frac{x^3}{3} + \ldots$ to ∞

or, $y = -\left(-x - \frac{x^2}{2} - \frac{x^3}{3} - \ldots \text{ to } \infty\right)$

or, $y = -ln(1 - x)$

$\therefore$ $\frac{dy}{dx} = -\frac{1}{1-x} - 1 = \frac{1}{1-x}$

47.(b) Given $f(x) = \tan^{-1}x$

So $f'(x) = \frac{1}{1+x^2} > 0$ for all real x

$\therefore$ The function is strictly increasing.

48.(a) Given $y\sin x = x + c$

On differentiation, $y\frac{d\sin x}{dx} + \sin x\frac{dy}{dx} = \frac{dx}{dx} + \frac{dc}{dx}$

or, $\sin x\frac{dy}{dx} + y\cos x = 1$

or, $\frac{dy}{dx} + y\cot x = \text{cosec}x$

On comparing with $\frac{dy}{dx} + Py = Q$ we get

$Q = \text{cosec } x$

49.(b)	50.(b)	51.(d)	52.(d)	53.(c)	54.(c)
55.(d)	56.(d)	57.(b)	58.(b)	59.(c)	60.(a)

Section – II

61.(c)

$I_{CD} = I_{AB} + Md^2$ (Parallel axis theorem)

or, $mk_{CM}^2 + Md^2$

or, $K_{CM} = \sqrt{K^2 - d^2}$

or, $K_{CM} = \sqrt{10^2 - 6^2} = 8$ cm

62.(c) $3mv = \sqrt{(m\times 39)^2 + (m\times 39)^2}$

or, $v = \frac{\sqrt{2\times 39^2}}{3}$

or, $v = 13\sqrt{2}$ m/s

63.(b) $E = K\frac{l}{3} = \frac{V}{l}\times\frac{l}{3}$ ...(1) $\left(\because K = \frac{V}{l}\right)$

$E = K'l' = \frac{V}{l + \frac{l}{2}}\times l'$ ... (2)

From (1) and (2)

$\frac{V}{l}\times\frac{l}{3} = \frac{V}{\frac{3l}{2}}\times l'$

or, $l' = \frac{l}{2}$

64.(b) $I \propto f^2a^2$

$\therefore$ $\frac{I_1}{I_2} = \left(\frac{f_1}{f_2}\right)^2\times\left(\frac{a_1}{a_2}\right)^2$

or, $\frac{1}{36} = \left(\frac{1}{2}\right)^2\times\left(\frac{a_1}{a_2}\right)^2$

or, $\frac{a_1}{a_2} = \frac{1}{3}$

65.(b) $\frac{m}{m_0} = \left(\frac{1}{2}\right)^{t/T_{1/2}}$

or, $80\% = \left(\frac{1}{2}\right)^{t/T_{1/2}}$

or, $0.8 = (0.5)^{t/T_{1/2}}$

or, $T_{1/2} = 31$ days

Again $\frac{m'}{m_0} = \left(\frac{1}{2}\right)^{t/T_{1/2}}\times 100\%$

$= \left(\frac{1}{2}\right)^{20/31}\times 100\%$

$= 63.9\%$

66.(a) $\frac{hc}{\lambda} = E_{ion} + K.E.$

or, $\lambda = \frac{hc}{E_{ion} + K.E.}$

or, $\lambda = \frac{6.62\times 10^{-34}\times 3\times 10^8}{(13.6 + 2.4)\times 1.6\times 10^{-19}}$

or, $\lambda = 7.75\times 10^{-8}$ m

67.(d) $Q = 6 - 2 = 4\mu C$

$\therefore$ $Q_1 = Q_2 = \frac{Q}{2} = 2\ \mu C = 2\times 10^{-6}C$

Then, $F = \frac{1}{4\pi\varepsilon_0}\frac{Q_1Q_2}{r^2}$

$= \frac{9\times 10^9\times 2\times 10^{-6}\times 2\times 10^{-6}}{(0.2)^2}$

$= 0.9$ N

68.(b) $S = \frac{G}{n-1}$; $n = \frac{I}{I_g} = 6$

$= \frac{10}{6-1}$

$= 2\Omega$ in parallel

69.(c) $h = \frac{2T\cos\theta}{r\rho g}$

or, $\frac{h}{\cos\theta} = \frac{2T}{r\rho g} = \text{constant}$

$\therefore$ $\frac{h_1}{\cos\theta_1} = \frac{h_2}{\cos\theta_2}$

2082-10-10 Hints & Solution

or, $\cos\theta_2 = \frac{h_2}{h_1} \times \cos\theta_1$

or, $\cos\theta_2 = \frac{1}{2} \times \cos 0°$

or, $\theta_2 = 60°$

70.(a) For maximA,

path diff = $n\lambda$

or, $\frac{yd}{D} = n\lambda$

or, $\frac{d}{2} \times \frac{d}{D} = n\lambda \left(\because y = \frac{d}{2}\right)$

$n = \frac{d^2}{2\lambda D}$

71.(d) $T_1V_1^{\gamma-1} = T_2V_2^{\gamma-1}$ ($\because TV^{\gamma-1}$ = constant)

or, $T_2 = T_1 \times \left(\frac{V_1}{V_2}\right)^{\gamma-1}$

or, $T_2 = 300 \times \left(\frac{V_1}{\frac{1}{4}V_1}\right)^{1.4-1}$

or, $T_2 = 300 \times 4^{0.4} = 522.3$ K

72.(b) $\cos\theta = \frac{R}{Z} = \frac{R}{\sqrt{R^2 + X^2}}$

or, $\cos\theta = \frac{3}{\sqrt{3^2 + 4^2}}$

or, $\cos\theta = 0.6$

73.(a) $dQ = msdT = m \times \frac{1}{2}T^2dT \left(\because S = \frac{1}{2}T^2\right)$

$\therefore$ $Q = \int_0^{50} dQ$

or, $Q = \frac{m}{2}\int_0^{50} T^2dT$

or, $Q = \frac{m}{2} \times \left[\frac{T^3}{3}\right]_0^{50}$

or, $Q = \frac{2}{2} \times \frac{1}{3} \times 50^3$

$= 41666$ J

74.(b) Molar mass of $MgSO_4 = 24 + 32 + (16\times4) = 120$ g/mol
Moles = 9.6/120 = 0.08 mol

75.(c) Rate $\propto [N_2][H_2]^3$. New rate = $(2)[N_2] \times (3[H_2])^3 = 2 \times 27 = 54$ times

76.(b) 2(+1) + 2x + 7(-2) = 0, where x is oxidation state of Cr
2 + 2x - 14 = 0, therefore x = +6

77.(d) As positive charge increases, ionic radius decreases (a is correct). Down the group, ionic radius increases (c is correct).

78.(a) Mn changes from +7 to +2, so electrons transferred = 5 Equivalent weight = Molecular weight/5 = 158/5

79.(c) In ethyne, each carbon forms 2 sigma bonds and has 2 pi bonds, indicating sp hybridization.

80.(b) Lucas reagent gives immediate turbidity with tertiary alcohols, turbidity after heating with secondary alcohols, and no reaction with primary alcohols.

81.(b) C_4H_{10} can exist as n-butane ($CH_3 - CH_2 - CH_2 - CH_3$) and isobutane ($CH_3 - CH(CH_3) - CH_3$)

82.(a) Here $g(x) = \log_e(x + \sqrt{x^2 + 1})$
$g(-x) = \log_e(-x+\sqrt{x^2 + 1}) = -\log_e(x + \sqrt{x^2 + 1}) = -g(x)$
So g(x) is odd. Also sine is odd. So their composition is odd.

83.(d) Given $\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \frac{1}{4^4} + \frac{1}{5^4} + \frac{1}{6^4} + \ldots$ to $\infty = \frac{\pi^4}{90}$

or, $\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \ldots + \left(\frac{1}{2^4} + \frac{1}{4^4} + \frac{1}{6^4} + \ldots\right) = \frac{\pi^4}{90}$

or, $\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \ldots + \left(\frac{1}{2^4\,1^4} + \frac{1}{2^4\,2^4} + \frac{1}{2^4\,3^4} + \ldots\right)$
$= \frac{\pi^4}{90}$

or, $\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \ldots + \frac{1}{2^4}\left(\frac{1}{1^4} + \frac{1}{2^4} + \frac{1}{3^4} + \ldots\right) = \frac{\pi^4}{90}$

or, $\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \ldots + \frac{1}{16}\frac{\pi^4}{90} = \frac{\pi^4}{90}$

or, $\frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \ldots = \frac{\pi^4}{90} - \frac{1}{16}\frac{\pi^4}{90} = \frac{15}{16}\frac{\pi^4}{90}$
$= \frac{\pi^4}{96}$

84.(b) Given $\left(\frac{1-i}{1+i}\right)^{100} = a + ib$

or, $\left(\frac{1-i}{1+i} \times \frac{1-i}{1-i}\right)^{100} = a + ib$

or, $\left(\frac{1 - 2i + i^2}{1^2 - i^2}\right)^{100} = a + ib$

or, $\left(\frac{1 - 2i - 1}{1 + 1}\right)^{100} = a + ib$

or, $\left(-\frac{2i}{2}\right)^{100} = a + ib$

or, $(-i)^{100} = a + ib$
$(i)^{100} = a + ib$

or, $(i^4)^{25} = a + ib$

or, $1 = a + ib$

or, $1 + 0i = a + ib$

$\Rightarrow$ a = 1, b = 0

85.(c) Given $\begin{vmatrix} a & 1 & a+c \\ b & 1 & c+a \\ c & 1 & a+b \end{vmatrix}$

Applying $C_3 \to C_3 + C_1$, $\begin{vmatrix} a & 1 & a+b+c \\ b & 1 & a+b+c \\ c & 1 & a+b+c \end{vmatrix}$

$= (a + b + c)\begin{vmatrix} a & 1 & 1 \\ b & 1 & 1 \\ c & 1 & 1 \end{vmatrix} = 0\ (\because C_2 = C_3)$

86.(b) C(n, 2) = 28

or, $\frac{n!}{(n-2)!\,2!} = 28$

or, $\frac{n(n-1)\,(n-2)!}{(x-2)!\,2!} = 28$

or, $x^2 - n - 56 = 0$

or, $(n - 8)(n + 7) = 0$

$\therefore$ n = 8

87.(b) Given $(1 + x^2)^{40}\left(x^2 + 2 + \frac{1}{x^2}\right)^{-5}$

$= (1 + x^2)^{40}\left\{\left(x + \frac{1}{x}\right)^2\right\}^{-5}$

$= (1 + x^2)^{40}\left(\frac{1 + x^2}{x}\right)^{-10}$

$= (1 + x^2)^{40}\frac{(1 + x^2)^{-10}}{x^{-10}} = (1 + x^2)^{30}\,x^{10}$

So, coefficient of x^{20} in $(1 + x^2)^{30}\,x^{10}$
= Coefficient of x^{10} in $(1 + x^2)^{30}$
= C(30, 5) or C(30, 25)

2082-10-10 Hints & Solution

88.(b) Let $y = m_1x$ and $y = m_2x$ be the lines represented by $x^2 + \lambda xy - 3y^2 = 0$. Then $m_1 + m_2 = \frac{\lambda}{-3}$, $m_1m_2 = \frac{1}{-3}$

Here, $m_1 + m_2 = 2m_1m_2$

or, $-\frac{\lambda}{3} = 2 \times -\frac{1}{3}$

$\Rightarrow \quad \lambda = 2$

89.(c) Eccentricity of hyperbola

$= \sqrt{1 + \frac{81}{144}} = \sqrt{\frac{225}{144}} = \frac{15}{12} = \frac{5}{4}$

and foic $= (\pm ae, 0) = \left(\pm\frac{12}{5} \times \frac{5}{4}, 0\right) = (\pm 3, 0)$

Again foci of ellipse $= (\pm ae, 0) = (\pm\sqrt{16 - b^2}, 0)$

So, $\sqrt{16 - b^2} = 3 \Rightarrow 16 - b^2 = 9 \Rightarrow b^2 = 7$

90.(b) $|\vec{a} \times \vec{i}|^2 + |\vec{a}|\,|\vec{i}| \sin\alpha = |\vec{a}| \sin\alpha$

$|\vec{a} \times \vec{i}|^2 = |\vec{a}|^2 \sin^2\alpha$

$|\vec{a} \times \vec{j}|^2 = |\vec{a}|^2 \sin\beta$

$|\vec{a} \times \vec{k}|^2 = |\vec{a}|^2 \sin^2\gamma$

So, $|\vec{a} \times \vec{i}|^2 + |\vec{a} \times \vec{j}|^2 + |\vec{a} \times \vec{k}|^2$

$= |\vec{a}|^2 (\sin^2\alpha + \sin^2\beta + \sin^2\gamma) = 2|\vec{a}|^2$

[Note that line makes angles α, β, γ with the coordinate axes].

91.(d) Given $\cos^{-1}\sqrt{p} + \cos^{-1}\sqrt{1 - p} + \cos^{-1}\sqrt{1 - q} = \frac{3\pi}{4}$

or, $\cos^{-1}\sqrt{p} + \sin^{-1}\sqrt{p} + \cos^{-1}\sqrt{1 - q} = \frac{3\pi}{4}$

or, $\cos^{-1}\sqrt{1 - q} = \frac{\pi}{4}$

or, $\sqrt{1 - q} = \cos\frac{\pi}{4}$

$\Rightarrow \quad \sqrt{1 - q} = \frac{1}{\sqrt{2}}$

$\Rightarrow \quad 1 - q = \frac{1}{2} \qquad \Rightarrow q = \frac{1}{2}$

92.(c) Given $f(x) = x^n$, $f'(x) = nx^{n-1}$, $f''(x) = n(n-1)x^{n-2}$, ..., $f^n(x) = n(n-1)(n-1) \ldots 1 = n!$

Now, $f(1) - \frac{f'(1)}{1!} + \frac{f''(1)}{2!} - \ldots + \frac{(-1)^n f^n(1)}{x!}$

$= 1 - \frac{n}{1!} + \frac{n(n-1)}{2!} - \ldots + (-1)^n \frac{n!}{n!}$

$= C(n, 0) - C(n, 1) + C(n, 2) - \ldots + (-1)^n C(n,n)$

$= (1 - 1)^n = 0$

93.(a) Given, $y^2 = 5x - 1$

or, $\frac{dy^2}{dy}\frac{dy}{dx} = 5\frac{dx}{dx} - \frac{d}{dx}$

or, $2y\frac{dy}{dx} = 5$

or, $\frac{dy}{dx} = \frac{5}{2y}$

At point (1, –2), slope of tangent $= \frac{5}{2x - 2} = -\frac{5}{4}$

So, slope of normal $= \frac{4}{5}$

Normal is $ax - 5y + b = 0$

So, slope $= -\frac{a}{-5}$

or, $\frac{4}{5} = \frac{a}{5}$

i.e. $a = 4$

Also, $4 \times 1 - 5x - 2 + b = 0$

$4 + 10 + b = 0$

i.e. $b = -14$

94.(b) $I = \int \frac{x \sin^{-1}x}{\sqrt{1 - x^2}}\,dx$

Put $y = \sin^{-1}x$

$\therefore \quad dy = \frac{1}{\sqrt{1 - x^2}}\,dx$

Then $I = \int y\sin y\, dy$

$= y\int \sin dy - \int\left(\frac{dy}{dx}\int \sin y\, dy\right) dy$

$= -y\cos y - \int -\cos y\, dy$

$= -y\cos y + \sin y + c = -\sin^{-1}x\sqrt{1 - x^2} + x + c$

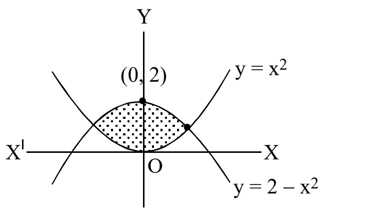
95.(b) $\int_{-1}^{3} \left[\tan^{-1}\frac{x}{x^2 + 1} + \tan^{-1}\frac{x^2 + 1}{x}\right] dx$

$= \int_{-1}^{3} \left[\tan^{-1}\frac{x}{x^2 + 1} + \tan^{-1}\frac{x}{x^2 + 1}\right] dx$

$= \int_{-1}^{3} \frac{\pi}{2}\, dx = \frac{\pi}{2}\int_{-1}^{3} dx = \frac{\pi}{2}[x]_{-1}^{3} = \frac{\pi}{2}[3 - (-1)]$

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

96.(a)



Given curves are

$y = x^2$ .... (i) $\quad y = 2 - x^2$ ... (ii)

Solving (i) and (ii),

$x^2 = 2 - x^2$

or, $2x^2 = 2$ $\quad$ or, $x^2 = 1$ $\quad$ i.e., $x = \pm 1$

Thus the required area

$= 2\int_a^b (y_1 - y_2)\, dx$

$= 2\int_0^1 (2 - x^2 - x^2)\, dx$

$= 2\int_0^1 (2 - 2x^2)\, dx$

$= 4\int_0^1 (1 - x^2)\, dx$

$= 4\left[x - \frac{x^3}{3}\right]_0^1 = 4\left(1 - \frac{1}{3}\right) - 0$

$= 4 \times \frac{2}{3} = \frac{8}{3}$ sq. units

97.(c) **98.(b)** **99.(b)** **100.(c)**

...Best of Luck...