Section – I

1.(b) Resultant of $\vec{A}$ & $\vec{B}$ lies on a plane and $\vec{C}$ lies in another plane so resultant can never be zero.

2.(c) $P = \frac{W}{t}$

or, $t = \frac{W}{P} = \frac{mgh}{P}$

$= \frac{200 \times 10 \times 40}{10 \times 10^3} = 8$ sec

3.(b) When spring is cut in 4 equal parts then K' = 4K

$\frac{T'}{T} = \sqrt{\frac{K}{K'}} = \sqrt{\frac{K}{4K}} = \frac{1}{2}$

$\therefore$ $T' = \frac{T}{2}$

4.(a) On heating upthrust decreases so it sink.

5.(a) $\frac{E'}{E} = \left(\frac{546}{273}\right)^4 = 16$

$\therefore$ E' = 16E

6.(a) $\omega t = 40t$ $kx = x$

or, $\omega = 40$ $k = 1$

or, $f = \frac{40}{2\pi}$ $\frac{2\pi}{\lambda} = 1$

$\lambda = 2\pi$

$\therefore$ $v = f\lambda = \frac{40}{2\pi} \times 2\pi = 40$ m/s

$\therefore$ $v = \sqrt{\frac{T}{m}}$

or, $T = v^2 m = 40^2 \times 10^{-2} = 16N$

7.(d) Distance = 30 + 10 + 10

= 50 cm

8.(c) Near point = –40 cm

u = 25 cm v = 40 cm

$f = \frac{uv}{u+v} = \frac{25(-40)}{25-40} = +\frac{200}{3}$ cm $= \frac{2}{3}$ m

$P = \frac{1}{f_{inm}} = \frac{3}{2} = +1.5D$

9.(a) $V = \frac{W}{Q} = \frac{4}{20} = 0.2$ V

10.(c) $I = \frac{E}{R+r} = \frac{50}{10+r}$

or, $10 + r = \frac{50}{4.5} = 11.1$

$\therefore$ $r = 1.1\ \Omega$

11.(a) When current divide in circle magnetic field at centre is zero.

12.(d) $T = 2\pi\sqrt{\frac{I}{MH}}$

$I = \left(\frac{l^2 + b^2}{12}\right)$ m, M = 2ml

Independent of length of suspension.

13.(b) $\frac{1}{\lambda} = R\left[\frac{1}{2^2} - \frac{1}{3^2}\right]$ for Hydrogen

or, $\frac{C}{\lambda} = CR\left[\frac{5}{36}\right]$

or, $f_0 = \frac{5RC}{36}$

For Helium $\frac{1}{\lambda} = Z^2R\left[\frac{1}{2^2} - \frac{1}{3^2}\right]$

or, $\frac{C}{\lambda} = Z^2\,RC\left[\frac{5}{36}\right]$

or, $f' = 4RC \times \frac{5}{36} = 4f$

14.(b) Voltage gain $= \frac{V_{out}}{V_{in}} = \frac{I_c\,R_{out}}{I_b\,R_{in}}$

$= \beta \times \frac{24}{3}$

$= 0.6 \times 8 = 4.8$

15.(d) Mg > Al > Na

Full filled s-orbital small site

16.(b) $-2 \times 2 + 3 \times 2$

$N_2H_4 \longrightarrow 2N$

Changes from –2 to +3 so that total of 10e.

17.(b) $\Delta H = \Delta E + \Delta ngRT$ or $\Delta H = \Delta E + RT$ or $\Delta H > \Delta E$

18.(c)

$H_2SO_4 \longrightarrow H^+ + SO_4^{--}$

$H_2O \longrightarrow H^+ + OH^-$

$H^+ \downarrow H_2$ (cathode), $OH^- \downarrow O_2$ (anode)

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

29.(b) Here, f(–x) = f(x) → even

f(–x) = –g(x) → odd

Now, (fog) (–x) = f(g(–x)) = f(–g(x)) = f(g(x))

= (fog)(x)

So, composite of even and odd functions is even.

30.(c) $A^2 - A + I = 0$ or $I = A - A^2$ or $I = A(I - A)$

$\therefore$ $A^{-1} = I - A$

31.(c) We have, Adj. A = |A| I $= 3\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$

32.(b) Given x = 0 → y-axis

y = 0 → x-axis and line 4x + 5y = 20

Put x = 0, y = 4 which is y-intercept

Put y = 0 x x = 5 which is x-intercept

Now, area of triangle $= \frac{1}{2} \times$ x-intercept × y-intercept

$= \frac{1}{2} \times 5 \times 4 = 10$ sq. units

33.(c) The circle is $x^2 + y^2 = 16$

Now, $5^2 + 4^2 - 16 = 25 > 0$. So the point (5, 4) is external and 2 tangents are possible.

34.(b) The parametric equations are

x = asech t, y = b canh t

Now, $\left(\frac{x}{a}\right)^2 + \left(\frac{y}{b}\right)^2 = \text{sech}^2t + \tanh^2t$

i.e., $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, which is an ellipse.

35.(d) Given conic section is $4x^2 - 9y^2 = 36$

i.e., $\frac{x^2}{9} - \frac{y^2}{4} = 1$ which is a hyperbola and a = 3, b = 2. So |PS – PS'| = 2a = 2 × 3 = 6.

36.(c) Given equation is $x^2 + y^2 = 0$ which implies

x = 0, y = 0

Here we can take any value of Z. So (0, 0, Z) lies on Z-axis.

37.(b) Here, centroid of triangle ABC = (2, 3, 4)

So, coordinates of A = (3 × 2, 0, 0) = (6, 0, 0) ⇒ x-intercept = 6

Coordinates of B = $(0 \times 3 \times 3, 0) = (0, 9, 0) \Rightarrow$ y-intercept = 9
Coordinates of C = $(0, 0, 3 \times 4) = (0, 0, 12) \Rightarrow$ z-intercept = 12
$\therefore$ Required equation of plane is
$\frac{x}{6} + \frac{y}{9} + \frac{z}{12} = 1$ or, $\frac{6x + 4y + 3z}{36} = 1$
i.e., $6x + 4y + 3z = 36$

38.(b) Here, $\vec{a} = \vec{i} + 2\vec{j} + 2\vec{k}$ So, $|\vec{a}| = \sqrt{1^2 + 2^2 + 2^2} = 3$
$\vec{b} = 6\vec{i} - 2\vec{j} + 3\vec{k}$ So, $|\vec{b}| = \sqrt{b^2 + (-2)^2 + 3^2} = 7$
$\therefore \frac{\text{Projection of } \vec{b} \text{ on } \vec{a}}{\text{Projection of } \vec{a} \text{ on } \vec{b}} = \frac{|\vec{b}|}{|\vec{a}|} = \frac{7}{3}$

39.(c) Given a = 1, b = 2, C = 60°
We have, area of $\Delta ABC = \frac{1}{2} \times ab \sin C$
$= \frac{1}{2} \times 1 \times 2 \times \sin 60° = \frac{\sqrt{3}}{2}$ sq. units

40.(a) Regression equations are
$20x - 9y - 107 = 0$ and $4x - 5y + 33 = 0$
The point of intersection (13, 17)
But point of intersection of regression lines
$= (\bar{X}, \bar{Y})$
$\therefore \bar{X} = 13, \bar{Y} = 17$

41.(b) Given $P(A \cap B) = \frac{1}{4}$ $P(\bar{B}) = \frac{5}{8}$, So $P(B) = 1 - P(\bar{B})$
$= 1 - \frac{5}{8} = \frac{3}{8}$
$\therefore P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{\frac{1}{4}}{\frac{3}{8}} = \frac{1}{4} \times \frac{8}{3} = \frac{2}{3}$

42.(c) We have, $\sim(p \Rightarrow q) \equiv p \wedge (\sim q)$
So the negation of "If battery is low then mobile doesnot work well" is battery is low and mobile works well.

43.(c) To have unique solution of AX = B, A^{-1} must exists and for this we must have $|A| \neq 0$

44.(d) Here, $\lim_{x \to a^-} f(x) \neq \lim_{x \to a^+} f(x)$. So by definition the discontinuity is jump.

45.(a) $\lim_{n \to \infty} \frac{1 + 2 + 3 + ... + n}{n^2}$
$= \lim_{n \to \infty} \frac{n(n+1)}{2n^2}$
$= \lim_{n \to \infty} \left(\frac{1}{2} + \frac{1}{n}\right) = \frac{1}{2} + 0 = \frac{1}{2}$

46.(c) Here, $\log_5 x = \log_5 e \log_e x$
So, $\frac{d\log_5 x}{dx} = \log_5 e \frac{d\log_e x}{dx} = \frac{\log_e 5}{x}$

47.(a) Suppose, $y = x^2$ So, $dy = 2x\,dx$
$= 2 \times 2 \times 0.01 = 0.04$

48.(c) Given $\frac{dy}{dx} = ye^x$ or, $\frac{dy}{y} = e^x dx$
Integrating $\int \frac{dy}{y} = \int e^x dx$
$l\text{ny} = e^x + c$
Using y(0) = e, we have $l\text{ne} = e^0 + c \Rightarrow c = 0$
Then $l\text{ny} = e^x$ So $l\text{ny} = e^1$ $\therefore y = e^e$

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

Section – II

61.(c) PE of dart = Energy of spring
or, $\frac{mgh_2}{mgh_1} = \left(\frac{x_2}{x_1}\right)^2 = \left(\frac{6}{4}\right)^2 = \frac{9}{4}$
$\therefore h_2 = \frac{9}{4} \times 2 = 4.5$ m

62.(a) $0 = \omega_0 + \alpha t$
or, $\alpha = -\frac{\omega_0}{t} = -\frac{2\pi f}{10} = -\frac{2\pi \times 20}{10} = -4\pi$ rad/s^2
$\tau = I\alpha$
$= 5 \times 10^{-3} \times 4\pi = \frac{\pi}{50}$ N

63.(a) Vol/s = Av
or, $70 \times 10^{-6} = 10^{-4}$ v
or, $70 \times 10^{-2} = \sqrt{2gh}$
or, $h = \frac{(70 \times 10^{-2})^2}{2g} = \frac{(70 \times 10^{-2})^2}{20}$
$= 0.0245$ m
$= 2.45$ cm

64.(d) $T_2V_2^{\gamma-1} = T_1V_1^{\gamma-1}$
or, $T_2 = 291 \left(\frac{V}{\frac{V}{8}}\right)^{1.4-1}$
$= 291(8)^{0.4} = 668$K
$= 395$°C
$\therefore \Delta T = 395 - 18 = 377$°C

65.(b) $\frac{\text{gain in time in 1 day}}{\text{lose in time in 1 day}} = \frac{\frac{1}{2}\alpha(\theta - 16) \times 1 \text{ day}}{\frac{1}{2}\alpha(40 - \theta) \times 1 \text{ day}}$
or, $\frac{5}{15} = \frac{(\theta - 16)}{(40 - \theta)}$
or, $3\theta - 48 = 40 - \theta$ or, $\theta = \frac{88}{4} = 22$°C

66.(c) $\frac{v}{4l_{c_1}} - \frac{v}{4l_{c_2}} = 4$
or, $\frac{v}{4}\left(\frac{1}{l_{c_1}} - 1\right) = 4$
or, $\frac{1}{l_{c_1}} = \frac{4 \times 4}{330} + 1 = \frac{346}{330}$
or, $l_{c_1} = \frac{330}{346} = 0.95$ m = 95 cm

67.(c) $\mu = \frac{\text{Real depth}}{\text{Apparent depth}}$
$\frac{4}{3} = \frac{x}{21 - x}$
$84 - 4x = 3x$
or, $x = \frac{84}{7} = 12$ cm

68.(a) $d\sin\theta_1 = \lambda$
or, $\sin\theta_1 = \frac{\lambda}{d}$
or, $\theta_1 = \sin^{-1}\left(\frac{\lambda}{d}\right) = \sin^{-1}\left(\frac{6328 \times 10^{-10}}{6.2 \times 10^{-3}}\right) = 0.18°$
$\therefore 2\theta_1 = 2 \times 0.18° = 0.36°$

69.(b) $Q = (C_1 + C)V'$

or, $C_1V_1 = (C_1 + C)V'$

or, $C_1 + C = \frac{5 \times 10^{-6} \times 12}{3}$

or, $C = 20\ \mu F - 5\mu F = 15\ \mu F$

70.(c) Deflection fall 50 div to 10 div means $I = 5I_g$

$\therefore\quad S = \frac{I_gG}{I - I_g}\qquad G = \frac{12(5I_g - I_g)}{I_g} = 48\Omega$

71.(d) $E = \frac{d\phi}{dt} = AN\frac{dB}{dt}$

$= (0.1)^2 \times 500 \times 1$

$= 5V$

72.(b) **1st case**

$\frac{hc}{\lambda} = \phi + e \times 2.5V$

or, $ev = \left(\frac{hc}{\lambda} - \phi\right) \times \frac{1}{2.5}$ .... (1)

2nd case

$\frac{hc}{1.5\lambda} = \phi + ev$

or, $ev = \left(\frac{hc}{1.5\lambda} - \phi\right)$ ....(2)

From (1) & (2)

$\left(\frac{hc}{\lambda} - \phi\right)\frac{1}{2.5} = \frac{hc}{1.5\lambda} - \phi$

or, $\frac{hc}{2.5\lambda} - \frac{\phi}{2.5} = \frac{hc}{1.5\lambda} - \phi$

or, $\frac{hc}{1.5\lambda} - \frac{hc}{2.5\lambda} = \phi - \frac{\phi}{2.5}$

or, $\frac{hc}{\lambda}\left(\frac{1}{1.5} - \frac{1}{2.5}\right) = \frac{hc}{\lambda_0}\left(1 - \frac{1}{2.5}\right)$

or, $\lambda_0 = \frac{1.5}{2.5} \times \frac{2.5 \times 1.5}{1}\lambda$

$= 2.25\lambda$

73.(c) Initially

$N_0 = \frac{6.023 \times 10^{23}}{99} \times 10^{-12}$

$= 6.08 \times 10^9$

After 1 hr

$N = N_0\left(\frac{1}{2}\right)^{t/T_{1/2}}$

$= 6.08 \times 10^9\left(\frac{1}{2}\right)^{1/6} = 5.41 \times 10^9$

$A = \lambda N = \frac{0.693}{T_{1/2}} \times N$

$= \frac{0.693}{6} \times 5.41 \times 10^9 = 6.24 \times 10^8$ dis/hr

74.(b) 5 moles of A need 10 moles of B

So B is limiting reagent

$\therefore$ 8 moles of B gives 4 moles C

75.(c)

76.(b) $V_a = ?\ N_a = \frac{98 \times 1.8 \times 10}{49}\ V_b = 200$ ml $N_b = 0.5N$

77.(c) Like CO_2, SnS_2 is $[Sn^{+++}]$ & $[S^{--}]^2$

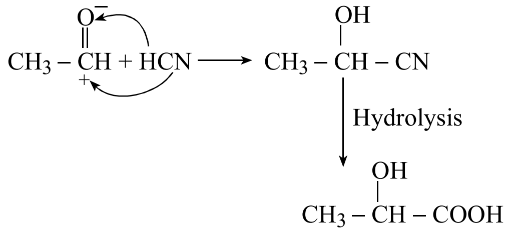
78.(b) If $conc^n$ of A double rate also double so A is 1st order & B is 2nd order.

79.(b) $Zn + NaOH \longrightarrow Na_2ZnO_2 + H_2O$

excess amionic part

80.(d)

81.(c)



2-Hydroxy propanoic acid
or
(actic acid)

82.(d) $n(U) = 140$, $n(A) = 75$, $n(B) = 85$

Here maximum possible value of $n(A \cup B) = 140$

Minimum possible value of $n(A \cup B) = 85$

So, $n(A' \cap B') = n(A \cup B)' = n(U) - n(A \cup B)$

i.e., $n(A' \cap B') = 140 - n(A \cup B)$

$\therefore$ Maximum value of $n(A' \cap B') = 140 - 85 = 55$

83.(a) Let a, b be two numbers. Then

$a_1A_1A_2$, b are in A.P. So $A_1 - a = A_1 - A_2$

i.e., $A_1 + A_2 = a + b$

a_1, G_1, G_2, b are in G.P. So $\frac{G_1}{a} = \frac{b}{G_2} \Rightarrow G_1G_2 = ab$

and a_1, H_1, H_2 b are in HP. So $\frac{1}{a}, \frac{1}{H_1}, \frac{1}{H_2}, \frac{1}{b}$ are in A.P.

Then, $\frac{1}{H_1} - \frac{1}{a} = \frac{1}{b} - \frac{1}{H_2} \Rightarrow \frac{1}{H_1} + \frac{1}{H_2} = \frac{1}{a} + \frac{1}{b} = \frac{a + b}{ab}$

or, $\frac{H_1 + H_2}{H_1H_2} = \frac{a + b}{ab} = \frac{A_1 + A_2}{G_1G_2}$

$\therefore\quad \frac{G_1G_2}{H_1H_2} = \frac{A_1 + A_2}{H_1 + H_2}$

84.(a) $\left(\frac{1 + i}{1 - i}\right)^x = 1$

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

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

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

or, $\left(\frac{2i}{2}\right)^x = 1$

or, $i^x = 1$

$\therefore\quad x = 4n, n \in Z^+$

as $i^2 = -1$

85.(c) Given equation is

$x^2 - |x| - 6 = 0$

When $x > 0$, the equation is $x^2 - x - 6 = 0$

i.e. $x = -2, 3$

$\Rightarrow\quad x = 3$

When $x < 0$ the equation, is $x^2 + x - 6 = 0$

i.e. $x = -3, 2 \Rightarrow x = -3$

$\therefore$ Product of real roots $= 3 \times -3 = -9$

86.(c) Here, number of diagonals = 44

or, $\frac{n(n - 3)}{2} = 44$

or, $n^2 - 3n = 88$

or, $n^2 - 3n - 88 = 0$

or, $n^2 - 11n + 8n - 88 = 0$

or, $n(n-11) + 8(n-11) = 0$
or, $(n-11)(n+8) = 0$
$\therefore$ $n = 11$ or
$n = -8$ (not possible)

87.(a) We have $(1+x)^n = C_0 + C_1x + C_2x^2 + ... + C_nx^n$
or, $x(1+x)^n = C_0x + C_1x^2 + C_2x^3 + ... + C_nx^{n+1}$
Differentiating,
$nx(1+x)^{n-1} + (1+x)^n = C_0 + 2C_1x + 3C_2x^2 + ... + (n+1)C_nx^n$
Putting x = 1, we have
$n2^{n-1} + 2^n = C_0 + 2C_1 + 3C_2 + ... + (n+1)C_n$
$\therefore$ $(n+2)\,2^{n-1} = C_0 + 2C_1 + 3C_2 + ... + (n+1)C_n$

88.(c) Given equation $ax^2 + 2hxy + by^2 = 0$
Here, $m_1 + m_2 = -\frac{2h}{b}$, $m_1m_2 = \frac{a}{b}$
Suppose, $m_1 = m$, $m_2 = 2m$
Then, $m + 2m = -\frac{2h}{b}$, $m.2m = \frac{a}{b}$
or, $3m = -\frac{2h}{b}$ $\quad 2m^2 = \frac{a}{b}$
or, $m = -\frac{2h}{3b}$ $\quad 2 \times \left(-\frac{2h}{3b}\right)^2 = \frac{a}{b}$
or, $2.\frac{4h^2}{9b^2} = \frac{a}{b}$ $\quad \therefore\ 8h^2 = 9ab$

89.(c) Given line is $y = mx + c$ and parabola is $x^2 = 4ay$
Solving, $x^2 = 4a(mx + c)$
$x^2 = 4amx + 4ac$
or, $x^2 - 4amx - 4ac = 0$
The line will touch if discriminant = 0
$(-4am)^2 - 4 \times 1 \times -4ac = 0$
or, $16a^2m^2 + 16ac = 0 \Rightarrow c = -am^2$

90.(d) Given $|\vec{a}| = 3$, $|\vec{b}| = 4$, $|\vec{c}| = 5$ and $\vec{a} + \vec{b} + \vec{c} = 0$
Now, $(\vec{a} + \vec{b} + \vec{c})^2 = |\vec{a}|^2 + |\vec{b}|^2 + |\vec{c}|^2 + 2(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a})$
$0 = 3^2 + 4^2 + 5^2 + 2(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a})$
or, $0 = 9 + 16 + 25 + 2(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a})$
or, $-50 = 2(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a})$
$\therefore$ $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a} = -25$

91.(b) $\sin^{-1}x + \sin^{-1}y = \frac{2\pi}{3}$ or, $\frac{\pi}{2} - \cos^{-1}x + \frac{\pi}{2} - \cos^{-1}y = \frac{2\pi}{3}$
i.e., $\cos^{-1}x + \cos^{-1}y = \frac{\pi}{3}$ ... (i)
and $\cos^{-1}x - \cos^{-1}y = \frac{\pi}{3}$ ... (ii)
Adding (i) and (ii),
$2\cos^{-1}x = \frac{2\pi}{3} \Rightarrow \cos^{-1}x = \frac{\pi}{3} \Rightarrow x = \cos\frac{\pi}{3} = \frac{1}{2}$
From (i), $\frac{\pi}{3} + \cos^{-1}y = \frac{\pi}{3} \Rightarrow \cos^{-1}y = 0 \Rightarrow y = 1$

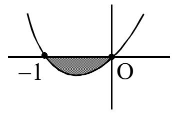
92.(c) Given $\tan^{-1}\left(\frac{1+x}{1-x}\right) = \tan^{-1}\left(\frac{1+x}{1-1.x}\right) = \tan^{-1}(1) + \tan^{-1}x = \frac{\pi}{4} + \tan^{-1}x$
So, $\frac{d}{dx}\tan^{-1}\left(\frac{1+x}{1-x}\right) = \frac{d\,\pi/4}{dx} + \frac{d\tan^{-1}x}{dx} = \frac{1}{1+x^2}$

93.(c) Let x and y be two numbers whose sum is 4.
Then $x + y = 4$
i.e. $y = 4 - x$
Let $S = \frac{1}{x} + \frac{1}{y} = \frac{x+y}{xy} = \frac{4}{x(4-x)} = \frac{4}{4x - x^2}$
Let $z = \frac{4x - x^2}{4}$
Then $\frac{dz}{dx} = \frac{4-2x}{4}$, $\frac{d^2z}{dx^2} = -\frac{1}{2}$
For maxima or minima, $\frac{dz}{dx} = 0 \Rightarrow \frac{4-2x}{4} = 0$
$\Rightarrow x = 2$
and $\frac{d^2z}{dx^2} = -\frac{1}{2} < 0$
$\therefore$ z is maximum and hence S is minimum.
So minimum value of $S = \frac{4}{4 \times 2 - 2^2} = \frac{4}{8-4} = \frac{4}{4} = 1$

94.(a) Put $x = \tan\theta$ $\quad$ i.e. $dx = \sec^2\theta\, d\theta$
Then, $I = \int e^\theta \left(\frac{1 + \tan\theta + \tan^2\theta}{1 + \tan^2\theta}\right) \sec^2\theta\, d\theta$
$= \int e^\theta \left(\frac{\tan\theta + \sec^2\theta}{\sec^2\theta}\right) \sec^2\theta\, d\theta$
$= \int e^\theta (\tan\theta + \sec^2\theta)\, d\theta$
$= e^\theta \tan\theta + c$
$= e^{\tan^{-1}x}\, x + c$

95.(b) Here $f(x) = x^2|x|$, $f(-x) = (-x)^2\,|-x| = x^2|x| = f(x)$
So, $\int_{-1}^{1} x^2|x|\, dx$
$= 2\int_0^1 x^2|x|\, dx = 2\int_0^1 x^2\, x dx = 2\int_0^1 x^3 dx$
$= 2\left[\frac{x^4}{4}\right]_0^1 = 2 \times \left(\frac{1}{4} - 0\right) = \frac{1}{2}$

96.(c) Given, $\frac{dy}{dx} = 2x + 1$



On integration,
$\int dy = \int (2x+1)\, dx$
$y = x^2 + x + c$
But it passes through (1, 2).
So, $2 = 1^2 + 1 + c$
i.e. $c = 0$
So the curve is $y = x^2 + x$
Along x-axis, y = 0
$x^2 + x = 0$
i.e. $x = 0, -1$
$\therefore$ Required area
$= \int_0^{-1} y\, dx = \int_0^{-1} (x^2 + x)\, dx = \left[\frac{x^3}{3} + \frac{x^2}{2}\right]_0^{-1}$
$= \frac{(-1)^3}{3} + \frac{(-1)^2}{2} = -\frac{1}{3} + \frac{1}{2} = \frac{-2+3}{6} = \frac{1}{6}$ sq. units

97.(d) **98.(a)** **99.(c)** **100.(d)**

...Best of Luck...