1. (a) $R_1 = 32 \times 10 = 320\Omega$

$$R_3 = \frac{R_y}{R_2} \times R_1 = \frac{40 \times 320}{80} = 160\Omega$$

$\therefore$ Colour code of R_3 be Brown, Blue, Brown.

2. (d) $Q = (B.E.)_R - (B.E.)_P$

$$= 20 \times 8.03 - (8 \times 7.07 + 12 \times 7.86)$$
$$= 160.6 - (56.56 + 94.32)$$

$\therefore Q = +9.72\text{meV}$

9.72 MeV released.

3. (a) $\because\ T = 2\pi\sqrt{\frac{1}{\mu B}}$

$$\frac{T_h}{T_c} = \sqrt{\frac{I_R}{I_c} \times \frac{\mu_c}{\mu_h}}$$

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

$T_h = T_c$

4. (c)

Heat loss = Heat gain

$$192 \times S(100 - 21.5) = (128 \times 0.394 + 240 \times 4.2)(21.5 - 8.4)$$
$$192 \times 78.5 \times S = 1058.432 \times 13.1$$
$$S = 0.91995\ \text{J/gK}^{-1}$$
$$S = 919.95\ \text{J/kgK}^{-1}$$

5. (a) $I = 2\left[\frac{2}{5}MR^2 + M4R^2\right] + M\frac{4R^2}{12}$

$$= MR^2\left[\frac{1}{3} + \frac{4}{5} + 8\right] = \frac{137}{15}MR^2$$

6. (b) $\frac{L\Delta T}{\Delta t} = 25$

$$\Rightarrow L = \frac{25 \times 1}{15} = \frac{5}{3}$$

$$\Delta U = \frac{1}{2}L\left(l_f^2 - I_1^2\right) = \frac{1}{2} \times \frac{5}{3} \times (25^2 - 10^2)$$

$$= \frac{5}{6} \times 525 = 4.7.5\ \text{J}$$

7. (b) $\frac{30R}{R+30} = 30 \times 00.95$

$\Rightarrow R = 570\Omega$

8. (d) $\tau = F \times 0.06 = 1.8 \times 0.012 \times 18 \times 10^{-6}$

$F = 6.48 \times 10^{-5}$

9. (a) $|\vec{A}+\vec{B}| = n|\vec{A}-\vec{B}|$

$\Rightarrow A^2 + B^2 + 2AB\cos\theta$

$= n^2(A^2 + B^2 - 2AB\cos\theta)$

$\Rightarrow \cos\theta(1+n^2) = \dfrac{2a^2(n^2-1)}{2a^2}$ $[A = B = a$

$\cos\theta = \dfrac{n^2-1}{n^2+1}$

10. (c) $n = \frac{16\times10^{-3}\times10^{-4}}{10\times10\times10^{-19}} \simeq 1.6\times10^{11}$

$(K.E.))_{max} = (10-5)eV = 5eV$

11. (d) $K.E. -3 = \vec{F}\cdot\vec{d}$

$K.E. = 3 + (3\hat{\imath} - 12\hat{\jmath}) \times (4\hat{\imath})$

$K.E. = 3 + 12 = 15\ J$

12. (a) $\sqrt{(2\ d)^2 + (d)^2} - 2\ d = \frac{\lambda}{2}$

$\Rightarrow\ (\sqrt{5}-2)d = \dfrac{\lambda}{2}$

$\Rightarrow\ d = \dfrac{\lambda}{2(\sqrt{5}-2)}$

13. (d) $\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2-\mu_1}{R}$

$\Rightarrow\ \dfrac{1.34}{V} - \dfrac{1}{-\infty} = \dfrac{0.34}{7.8}$

$\Rightarrow\ v = \dfrac{1.34\times7.8}{0.34}\ nm = 3.074\ cm$

14. (a)

$R = \dfrac{P}{I^2} = \dfrac{4.4}{4\times10^{-6}}\Omega$

$P' = \dfrac{V^2}{R} = \dfrac{11\times11\times4\times10^{-6}}{4.4}\ W$

$= 11\times10^{-5}\ W$

15. (c)

$v = \pi R^2\ h = \dfrac{\pi}{4}D^2\ h$

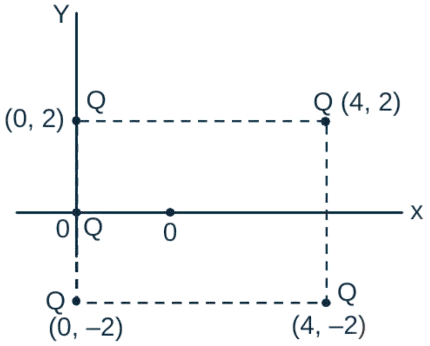
$= 4260\ cm^2$

$\because\ \dfrac{\Delta v}{v} = 2\dfrac{\Delta D}{D} + \dfrac{\Delta h}{h}$

$= \left(2 \times \frac{0.1}{12.6} + \frac{0.1}{34.2}\right) v$
$= \frac{2 \times 426}{12.6} + \frac{426}{34.2}$
$= 67.61 + 12.459 = 80.075$

$\therefore\ v = 4260 \pm 80\ \text{cm}^3$

16. (b)



$W = VQ = \frac{1}{4\pi\varepsilon_0} Q^2 \left[\frac{1}{2} + \frac{1}{2} + \frac{2}{2\sqrt{5}}\right]$

$\therefore\ \frac{Q^2}{4\pi\varepsilon_0}\left[1 + \frac{1}{\sqrt{5}}\right]$

17. (d)

18. (a) $\frac{250\text{kHz}}{1.5\text{kHz}} = 13.33$

$\therefore$ Possible hormones

1,3,5,7,9,11,13

i.e 6 .

19. (a) $i_{10k} = \frac{50}{10k} = 5\ \text{mA}$

$i_{5k} = \frac{120 - 50}{5k} = 14\ \text{mA}$

$i_2 = (14 - 5)\text{mA} = 9\ \text{mA}$

20. (b) $\vec{E} = 10\hat{j}\cos(6x + 8z - 10ct)$

$B_0 = \frac{E_0}{C} = \frac{10}{C}$

$W = 10C$

$\because\ \hat{E} \times \hat{B} = \hat{C}$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 1 & 0 \\ B_x & B_y & B_z \end{vmatrix} = \frac{6\hat{i}+8\hat{j}}{10}$$

$$\Rightarrow B_z\hat{\imath} - 0\hat{\jmath} - B_x\hat{k} = \frac{3}{5}\hat{\imath} + \frac{4}{5}\hat{\jmath}$$

$$B_z = \frac{3}{5}, B_y = 0, B_z = \frac{4}{5}$$

$$\therefore \vec{B} = \frac{1}{C}(-8\hat{\imath} + 6\hat{k})\cos(6x + 8z + 10ct)$$

21. (d)

$\because F \propto \frac{1}{r^3}$

Required force $= 27$ F.

22. (d)
23. (b)

$W = nR\Delta T$

$= \frac{1}{2} \times 8.31 \times 70$

$= 290.85$ J

24. (b)

$W = \frac{Q^2}{2c} - \frac{Q^2}{2ck}$

$= \frac{Q^2}{2c}\left[1 - \frac{1}{k}\right]$

$= \frac{1}{2} \times 12 \times 100\text{pJ}\left(1 - \frac{1}{6.5}\right)$

$= \frac{12 \times 100 \times 11}{2 \times 13}\text{pJ} = 507.69\text{pJ}$

25. (d)

$r_{t=5} = \text{area}$

$= \left(\frac{1}{2} \times 2 \times 2 + 2 \times 2 + 3 \times 1\right)\text{m}$

$= (2 + 4 + 3)\text{m}$

$= 9$ m

26. (a) $= \frac{\tau}{I}$

$= \frac{5M_0\, g\ell - 4M_0\, g\ell}{5M_0\ell^2 + 2M_0 4\ell^2}$

$= \frac{M_0\, g\ell}{13M_0\ell^2}$

$= \frac{g}{13\ell}$

27. (a) $2|\vec{P} + \vec{Q}| = |\vec{P} + 2\vec{Q}|$

$\Rightarrow 13 + 12\cos\theta = 10 + 6\cos\theta$

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

$\theta = 120°.$

28. (b) (BONUS)

$A\rho g\ x = F_{\text{restoring}}$

$\pi r^2 \rho g x = n\omega^2 x$

$$\therefore\ \omega = \sqrt{\frac{\pi r^2 \rho g}{\rho v}}$$

$$= r\sqrt{\frac{\pi g}{v}} = 2.5 \times 10^{-2}\sqrt{\frac{3.14 \times 10}{310 \times 10^{-6}}}$$

$$= 2.5 \times 10^{-2} \times 10^2\sqrt{10}$$

$$\omega = 2.5 \times \sqrt{10}$$

$$\therefore\ f = \frac{2.5 \times \sqrt{10}}{2\pi} = 1.25$$

29. (C)

$|v_4| = |a_4|$

$\Rightarrow\ \left(w\sqrt{A^2 - x^2}\right)_4 = (w^2 x)_4$

$\Rightarrow\ w\sqrt{25 - 16} = w^2 \times 4$

$\Rightarrow\ w = \frac{3}{4}$

$T = \frac{2\pi}{W} = 2\pi\frac{4}{3} = \frac{8\pi}{3}$

30. (c)

$E = \frac{1}{2}MV_m^2$

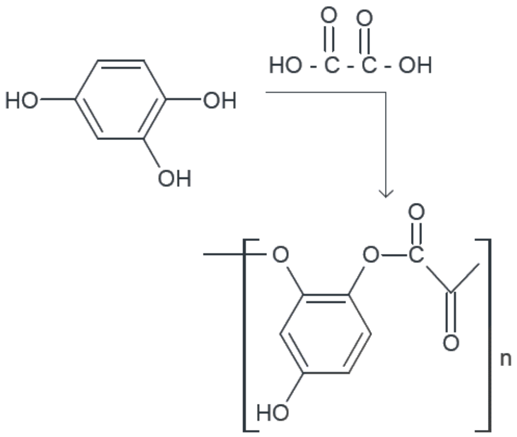
$= \frac{1}{2} \times 2 \times \left(\frac{3P}{\rho}\right)$

$= \frac{3 \times 4 \times 10^4}{8} = 1.5 \times 10^4\ J$

31. (c) $E = -13.6\frac{n^2}{z^2}eV$

$E_{He}^{+} = -13.6\frac{4}{9}$

32. (a)
33. (c)



34. (c) $0.1=\frac{n_{C_{12}H_{22}O_{11}}}{2}$

$n_{C_{12}H_{22}O_{11}}=0.2$

$Wt_{C_{12}H_{22}O_{11}}=0.2\times 342=68.4$

35. (a) First reaction will be requiring a catalyst among halogens oxidizing power decrease down the group.
36. (d) $NH_4HS(s)\rightleftharpoons NH_3(g)+H_2S(g)$

5.1 g

0.1 g mol − 0.03 0.03 mol 0.03 mol

$V=3$ L, T = 327°C $\frac{0.98}{2}$ $\frac{0.98}{2}$

$K_P=P_{NH_3}P_{H_2S}$ PV = nRT

$K_P=\frac{0.98}{2}\times\frac{0.98}{2}$ $P\times 3=0.06\times 0.0821\times 600$

$K_P=0.243$

$$P=\frac{0.06\times 0.0821\times 200}{3}$$

$P=0.98$

37. (b) CH_4 is not present in stratosphere.
38. (d) $E=E^{\circ}-0.06\log\frac{[H^+][Cl^-]}{[H_2]^{1/2}}$

$$0.92=E^{\circ}-0.06\log\frac{10^{-6}\cdot 10^{-6}}{1^{1/2}}$$

$0.92=E^0-0.06\log 10^{-12}$

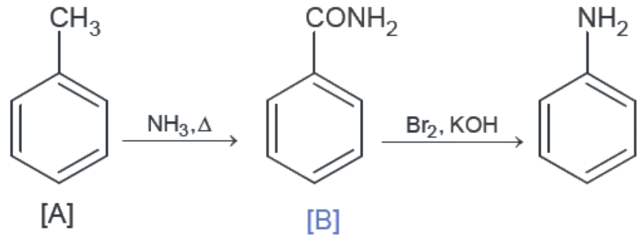
$E^0+0.06\times 12$

$E^0=0.92-0.06\times 12$

$E^{\circ}=0.92-0.72$

$E^{\circ}_{Ag}/AgCl = 0.20$

39. (b) The electron configuration is $[Xe]4f^{14}5d^{1}6s^{2}$
40. (a)
41. (a)



42. (d) $CaSO_4(s) \longrightarrow CaO(s) + SO_3(g)$

$CO_2(s) \longrightarrow CO_2(g)$

$I_2 \longrightarrow I_2(aq)$

$N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$

$N_2(g) + 3H_2 \rightleftharpoons 2NH_3(g)$

$\Delta S = 2\Delta S_{NH_3} - [\Delta S_{N_2} + 3\Delta S_{H_2}]$

There is decrease in number of moles of NH_3 entropy is decreasing.

43. (c) $q = P\Delta V$

$q = 16$

$C_P = 24$

$C_P = \frac{qP}{\Delta T}$

$\Delta T = \frac{16}{24} K = \frac{2}{3} K$

44. (d) $\Delta T_b = K_b m$

$\Delta T_b = K_b \times 1 \Rightarrow 2 = K_b$
$\Delta T_f = K_f m$
$2 = 2 K_f = K_f$
$\frac{K_f}{K_b} = \frac{1}{2}$

45. (d) $NaBH_4$ reduces both carbonyl group and imine.
46. (d)
47. (d)

$\frac{1}{2}\frac{d[A]}{dt} = -K_1[A]_2 + K_{-1}[A]^2$

$\frac{d[A]}{dt} = 2 K_1[A_2] - 2 K_{-1}[A]^2$

48. (b) Barfoed test is used to detect monosaccirides.

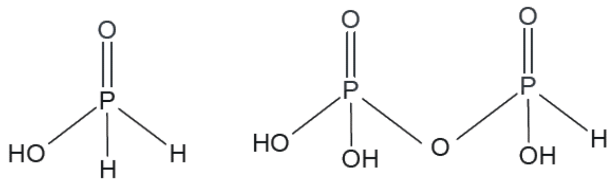
49. (c) Co^{2+} high spin $t_{2g}^{5}e_{g}^{2}$ ' 3 ' unpaired electrons

Co^{2+} low spin $t_{2g}^{6}e_{g}^{1}$ ' 1 ' unpaired electron

Difference is $3-1=2$

50. (d)

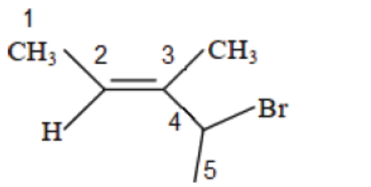
51. (b)



H_3PO_2 $H_4P_2O_5$

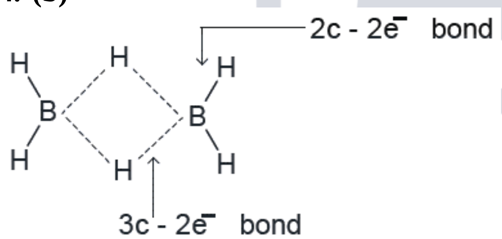
52. (b) Iodoform reaction can be used for this transformation.

53. (d)



4-Bromo-3-methyl pentane

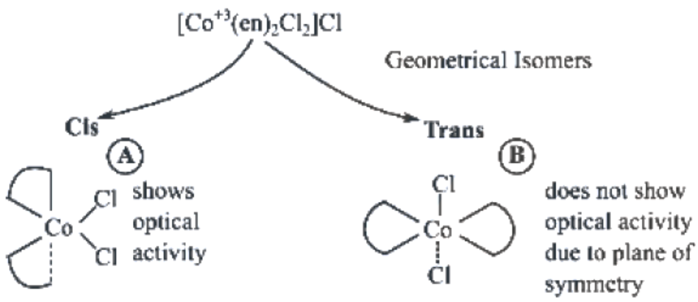
54. (b)



55. (a) $5C_2O_4^{2-}+2KMnO_4+H^+\longrightarrow 10CO_2+2Mn^{2+}+H_2O$

After balancing 10 gain or loss of electron.

56. (a) Cobalt (III) chloride on reaction with ethylenediemine in ratio $1:22$ isomeric products complexes A and B



57. (a) $[Au(CN_2]^-$ and $[Ag(CN)_2]^-$ both are soluble complexes.

58. (d) Formula of the compounds

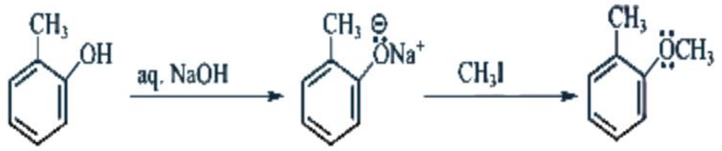
No. of octahedral voids are equal to the number of atoms forming lattice

A occupy octahedral void i.e. $2/3$ of them

B forms crystal lattice

$A_{2/3}B \Rightarrow A_2B_3$

59. (b)



60. (d) 'EAS' first ring is activated and second is deactivated NO_2^+ attack at para position of activated ring.

61. (d) $\alpha^2+\beta^2=(\alpha+\beta)^2-2\alpha\beta$

$=(3-\lambda)^2-2(2-\lambda)$

$=\lambda^2+9-6\lambda-4+2\lambda$

$=\lambda^2-4\lambda+5$

$\therefore$ For least value $\lambda=2$

62. (a) Using formula $\frac{\sin 2^nA}{2^n\sin A}=\cos A\cos 2A\cos 2^2A\ldots\ldots\ldots\cos 2^{n-1}A$

63. (a) $x^2dx+2xydy-y^2dx=0$

$x^2dx=y^2dx-2xydy$

$(x^2-y^2)dx+2xydy=0$

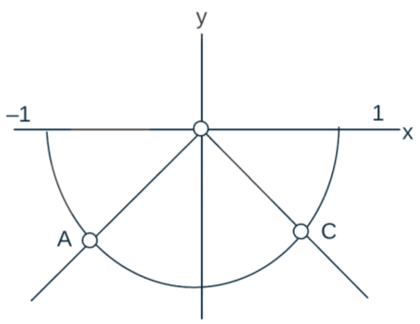
$$\mathrm{dx}=-\left(\frac{\mathrm{x}\cdot 2\mathrm{ydy}-\mathrm{y}^2\mathrm{dx}}{\mathrm{x}^2}\right)$$

Integrals

$$x=-\frac{y^2}{x}+c$$

$$x^2+y^2=cx$$

64. (c) A, B, C are sharp edges



65. (a) $x^2\left(\sqrt{x}+\frac{\lambda}{x^2}\right)^{10}$

Consider constant term

$^{10}C_r(\sqrt{x})^{10-r}\left(\frac{\lambda}{x^2}\right)^r$

$\frac{10-r}{2}-2r=0$

$10-5r=0$

$r=2$

$\Rightarrow {}^{10}C_2 \times \lambda^2 = 720 \Rightarrow \lambda = 4$

66. (b) $y = xe^{x^2}$

$(1, e)$ lies on this

Now $\frac{dy}{dx} = x^{x^2} \cdot 2x + e^{x^2} \cdot 1$

Put $x = 1$

$\mathrm{m} = 2\mathrm{e} + \mathrm{e} = 3\mathrm{e}$

Equation of tangent at $(1, \mathrm{e})$

$\mathrm{y} - \mathrm{e} = 3\mathrm{e}(\mathrm{x} - 1)$

$y - e = 3ex - 3e$

$y = 3ex - 2e$

$\left(\frac{4}{3}, 2\mathrm{e}\right)$ satisfies it

67. (a) $\left.\begin{matrix} f(g(1)) = 1 \\ f(g(2)) = 1 \end{matrix}\right\}$ Many one

$\mathrm{f}(\mathrm{g}(2\mathrm{k})) = \mathrm{k}$

$\mathrm{f}(\mathrm{g}(2\mathrm{k}+1)) = \mathrm{k}+1$

$\therefore$ Onto

68. (b)

$\begin{vmatrix} \sin 3\theta & -1 & 1 \\ \cos 2\theta & 4 & 3 \\ 2 & 7 & 7 \end{vmatrix} = 0$

$7\sin 3\theta + 14\cos 2\theta - 14 = 0$

$\sin 3\theta + 2\cos 2\theta - 2 = 0, \sin \theta = \frac{1}{2}$

69. (a) $\vec{\alpha} = (\lambda - 2)\vec{a} + \vec{b}$

$\vec{\beta} = (4\lambda - 2)\vec{a} + 3\vec{b}$

$\vec{\alpha}$ and $\vec{\beta}$ are collinear

$$\begin{vmatrix} \lambda-2 & 1 \\ 4\lambda-2 & 3 \end{vmatrix} = 0$$

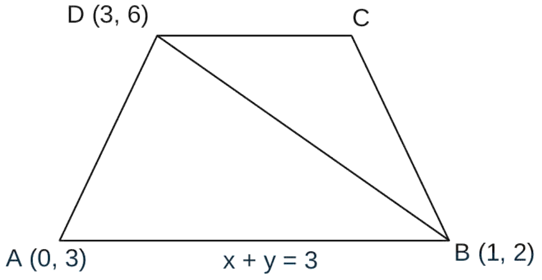
$3\lambda - 6 - 4\lambda + 2 = 0$

$-\lambda - 4 = 0$

$\lambda = -4$

70. (d)

Intersection point is $A(0,3)$ $M = (4,6)$
$B \Rightarrow (1,2), D \rightarrow (3,6)$



71. (a) Differentiability we get $f(x) = 2x - x^2 f(x)$

$$f(x) = \frac{2x}{1+x^2} \Rightarrow f''(x) = 2\frac{(1-x^2)}{(1+x^2)^2}$$
$$f'\left(\frac{1}{2}\right) = \frac{24}{25}$$

72. (a)

$$\left(\frac{\sqrt{3}}{2} + \frac{i}{2}\right)^5 = \left(e^{i\frac{\pi}{6}}\right)^5 = e^{i5\pi/6}$$

$$\therefore\ z = 2\cos\frac{5\pi}{6} = 2\left(-\frac{\sqrt{3}}{2}\right) = -\sqrt{3}$$

73. (c)

$$1 - \left(\frac{2}{3}\right)^n > \frac{5}{6}$$
$$\left(\frac{2}{3}\right)^n < \frac{1}{6}$$
$$\Rightarrow n = 5$$

74. (b)

$\int x^5 \cdot e^{-4x^3} dx$

$$= \int\ x^2 \cdot x^3 e^{-4x^3} dx$$

$-4x^3 = t$
$-12x^2 dx = dt$
$= \frac{-1}{12}\int -\frac{t}{4}e^t dt$
$= \frac{1}{48}\int te^t dt$
$= \frac{1}{48}te^t - 1 \cdot e^t + c$
$= \frac{1}{48}e^{-4x^3} \cdot (-4x^3) - e^{-4x^3} + c$

75. (d) $r = \sqrt{25+36-c} = \sqrt{36}$
$c = 25$

76. (d) P is True

Q is False

R is True

$\therefore \sim Q$ is True

$\sim Q \wedge R$ is True

$\therefore P \vee (\sim Q \wedge R)$ is True.

77. (d) $x = \sqrt{2}y - 4\sqrt{2}$
$x^2 = 4y$

Solving we get point of intersection

$A(-2\sqrt{2}, 2), B(4\sqrt{2}, 8)$

$\therefore AB = \sqrt{(6\sqrt{2})^2 + 6^2} = 6\sqrt{3}$

78. (a) $\mathrm{Det}\,A = b^2 + 3$
$\frac{\det A}{b} = b + \frac{3}{b}$

$\therefore$ Least value $= 2\sqrt{3}$

79. (b) $\frac{y^2}{1+r} - \frac{x^2}{1-r} = 1$

$r > 1 \Rightarrow$ ellipse

$e = \sqrt{1 - \left(\frac{r-1}{r+1}\right)} = \sqrt{\frac{2}{r+1}}$

80. (b)

$\sum_{r=1}^{25} \frac{50}{r!\,50-r} \times \frac{50-r}{\underline{25-r25}}$

$= \sum_{r=1}^{25} \frac{\underline{50}}{r\lfloor 25 - r\lfloor 25}$

$= \frac{50}{|\,25} \sum_{r=1}^{25} \frac{1}{\underline{r\,|\,25-r}}$

$= \frac{\underline{50}}{25\,|\,25} \sum_{r=1}^{25} {}^{25}C_r = {}^{50}C_{25}(2^{25}-1)$

81. (d) $A(-3,3,4), B(3,7,6)$

Mid point $\Rightarrow (0,2,5)$

$\vec{n} = \overrightarrow{AB} = 6\hat{\imath} + 10\hat{\jmath} + 2\hat{k}$

Equation of plane $\vec{r} \cdot \vec{n} = \vec{a} \cdot \vec{n}$

$\vec{r} \cdot (6\hat{\imath} + 10\hat{\jmath} + 2\hat{k}) = (0\hat{\imath} + 2\hat{\jmath} + 5\hat{k}) \cdot (6\hat{\imath} + 10\hat{\jmath} + 2\hat{k})$

$3x + 5y + z = 15$

$(4,1,-2)$ satisfies it

82. (a) $\cot\left[\sum_{n=1}^{19} \cot^{-1}\left(1 + \sum_{p=1}^{n} 2p\right)\right]$

$= \cot[\sum_{n=1}^{19} \cot^{-1}(1 + n^2 + n)]$

$= \cot\left[\sum_{n=1}^{19} \tan^{-1}\left(\frac{1}{1+n^2+n}\right)\right]$

$= \cot[\sum_{n=1}^{19} \tan^{-1}(n+1) - \tan^{-1} 1]$

$= \cot[\tan^{-1} 20 - \tan^{-1} 1]$

$= \cot\left(\tan^{-1}\frac{19}{21}\right)$

$\Rightarrow \frac{21}{19}$

83. (d) $\sum x = 50$

$(3)^2 = \frac{1}{5}\left(ex^2 - \frac{(ex)^2}{5}\right)$

$9 = \frac{1}{5}\left(\sum x^2 - \frac{2500}{5}\right)$

$\therefore \sum x^2 = 545$

New variable $= \frac{1}{6}\left(3045 - \frac{0}{6}\right) = 507.5$

84. (b) $f'(x) = 7 - \frac{3}{4} \cdot \frac{f(x)}{x}, x > 0$

$\therefore \mathrm{f}'(\mathrm{x}) + \frac{3}{4\mathrm{x}}\mathrm{f}(\mathrm{x}) = 7$

(Linear)

$f(x) \cdot e^{\int \frac{3}{4x}dx} = \int 7 \cdot e^{\int \frac{3}{4x}dx} + c$

$f(x) \cdot x^{3/4} = \int 7 \cdot x^{3/4} + c$

$= 7\frac{\mathrm{x}^{7/4}}{\frac{7}{4}} + \mathrm{c}$

$\therefore \mathrm{f}(\mathrm{x}) = 4\mathrm{x} + \mathrm{cx}^{-3/4}$

$\therefore \mathrm{f}\left(\frac{1}{\mathrm{x}}\right) = \frac{4}{\mathrm{x}} + \mathrm{cx}^{3/4}$

$\therefore \mathrm{Lt}_{x\to 0^+}\, xf\left(\frac{1}{x}\right) = \mathrm{Lt}_{x\to 0^+}\, 4 + cx^{7/4} = 4$

(h, k)

85. (b)

$\frac{\mathrm{k}-3}{\mathrm{h}-4} = 0\ \mathrm{k} = 3$

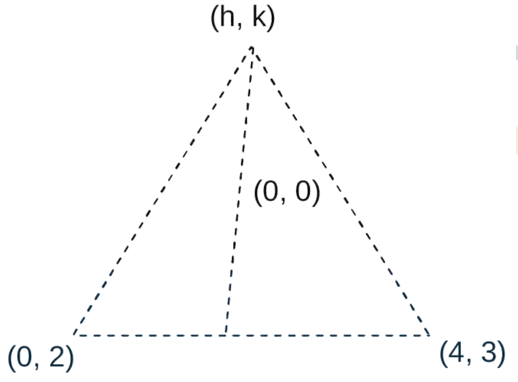
$\frac{\mathrm{k}}{\mathrm{h}} = -\frac{4-0}{3-2}\ \ -4\ \mathrm{h} = \mathrm{k}$

$h = \frac{-3}{4}$

(0,2)

86. (c)

$\int_{-\pi/2}^{\pi/2} \frac{dx}{[x]+[\sin x]+4}$



$= \int_{-\pi/2}^{0} \frac{dx}{[x]+-1+4} + \int_{0}^{\frac{\pi}{2}} \frac{dx}{[x]+4}$

$= \int_{-\pi/2}^{-1} \frac{\mathrm{dx}}{-2-1+4} + \int_{-1}^{0} \frac{\mathrm{dx}}{-1-1+4} + \int_{0}^{1} \frac{\mathrm{dx}}{4} + \int_{1}^{\pi/2} \frac{\mathrm{dx}}{1+4}$

$= -1 + \frac{\pi}{2} + 2 + \frac{1}{4} + \frac{1}{5}\left(\frac{\pi}{2} - 1\right)$

$= 3\frac{\pi}{5} - \frac{9}{20}$

87. (c) Put $(2\lambda + 4, 2\lambda + 5, \lambda + 3)$ in $x + y + z = 2$

$2\lambda + 4 + 2\lambda + 5 + \lambda + 3 = 2$

$5\lambda = -10\ \lambda = -2$

$P(0,1,1)$

88. (b)

89. (a) $a = \sqrt{3} + 1$

$b = \sqrt{3} - 1$

$$\frac{\sin A}{\sin B} = \frac{\sqrt{3}+1}{\sqrt{3}-1} = \frac{3+1+2\sqrt{3}}{2} = 2 + \sqrt{3}$$

$$\frac{\sin A}{\sin(120 - A)} = \sqrt{3} + 2$$

$$\frac{\sin A}{\sin 12\cos A - \cos 12\sin A} = \sqrt{3} + 2$$

$$\frac{1}{\frac{\sqrt{3}}{2}\cot A + \frac{1}{2}} = \sqrt{3} + 2$$

$$\frac{\sqrt{3}\cot A + 1}{2} = \frac{1}{\sqrt{3}+2}$$

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

$$\frac{\sqrt{3}\cot A + 1}{2} = -\sqrt{3} + 2$$

$\sqrt{3}\cot A = 4 - 2\sqrt{3} - 1$

$\sqrt{3}\cot A = 3 - 2\sqrt{3}$

$\cot A = \sqrt{3} - 2$

$-\cot A = 2 - \sqrt{3} = \tan 15$

$\therefore A = 105^\circ$

$\therefore B = 15^\circ$

90. (c) $y = x^{3/2} - 2\ \frac{dy}{dx} = \frac{3}{2}\sqrt{x}$

Slope of normal $= -\frac{2}{3\sqrt{x}}$

Let point is $\left(x_1, x_1^{3/2} - 2\right)$

$\therefore$ Normal $y - \left(x_1^{3/2} - 2\right) = \frac{-2}{3\sqrt{x_1}}(x - x_1)$

Now put (1,7) and solve it.

$\Rightarrow x_1 = \frac{1}{3}$

$\therefore P \Rightarrow \left(\frac{1}{3}, 7 + \frac{1}{3\sqrt{3}}\right), A \Rightarrow (1,7)$

$\therefore AD = \frac{1}{6}\sqrt{\frac{7}{3}}$