Physics

1. (d) $\frac{b}{2}\sin\theta = \frac{\lambda}{2}$

$= \sin\theta \cong \theta = \frac{\lambda}{b}$

2. (a) R. P $\propto \frac{1}{\lambda}$

3. (d)

$\frac{4\lambda D}{d} = \frac{5\lambda' D}{d}$

$\lambda' = \frac{4\lambda}{5} = 4000\text{Å}$

4. (b) $i = ne$

$\eta = \frac{1.6 \times 10^{-3}}{1.6 \times 10^{-19}}$
$= 10^{16}$

5. (c) $U = -2K$

$= -2 \times \frac{e^2}{8\lambda\varepsilon_0 r}$

6. (d) $\frac{1}{\lambda_{L_1}} = R \times \frac{3}{4}$

$\lambda_{L_1} = \frac{4}{3R} = \lambda$
$\frac{1}{\lambda_{P_1}} = R\left(\frac{1}{9} - \frac{1}{16}\right)$
$\frac{1}{\lambda_{P_1}} = R\frac{7}{144}$

$\lambda_{P_1} = \frac{144}{7R}$
$= \frac{36 \times 3}{7}$
$\lambda_{P_1} = \frac{108}{7}\lambda$

7. (a)

8. (d) $92 = 82 + 2x - 6$

$x = 8$

9. (c) $R = R_0 A^{\frac{1}{3}}$

$\frac{R_1}{R_2} = \left(\frac{64}{27}\right)^{\frac{1}{3}} = \frac{4}{3}$

10. (b) $\Delta V = E \times d$

$= 10^6 \times 5 \times 10^{-7}$
$= 0.5\ V$

11. (a)

A	B	$\overline{A+B}$
0	0	1
1	1	0

12. (d) 0.5μm

13. (c) M.I. $= \frac{8}{10} = 0.8$

Amplitude of USB $= \frac{mV_e}{2}$

$= \frac{0.8 \times 10}{2}$

$= 4\ V$

14. (a) Sky wave

15. (b) $F = \frac{8KQ^2}{r^2}$

Final charge on each sphere $= Q$

$F' = \frac{KQ^2}{\left(\frac{r}{2}\right)^2} = 4\frac{K^2}{r^2}$

$= \frac{4\ F}{8}$

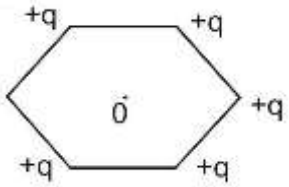
$F' = \frac{F}{2}$

16. (a)

$E = \frac{Kq}{r^2}$

$q = 1\mu c$

$r = 1m$



$= 10^{-6}$ K

17. (b, c)

18. (d)

19. (b)

$$C = \frac{\varepsilon_0 A}{2d} + \frac{\varepsilon_0 A}{d} + \frac{\varepsilon_0 A}{2d} = \frac{2\varepsilon_0 A}{d}$$

20. (c) Potential energy of the system is decreasing

21. (b) $P = I^2R$

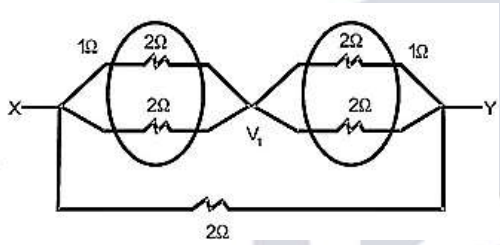
$P \propto I^2$

22. (c) $R = 10 \times 10^5 \pm 20\%$

$= 1 \times 10^6 \pm 20\%$

Range is $8 \times 10^5\Omega$ _____ $12 \times 10^5\Omega$

23. (b)



$R_{XY} = 1\Omega$

24. (a) $R = \frac{\rho \ell}{A}$

25. (b) Torque $= c\theta, \theta$ is dimension less

$[C] = [\text{ torque }] = [M^1\ L^2\ T^{-2}]$

26. (d) $B = \mu_0 ni$

$= 4\pi \times 10^{-7} \times (50 \times 100) \times 2.5$
$= 4\pi \times 5 \times 2.5 \times 10^{-4}$
$= 5\pi \times 10^{-3}(\text{ T})$

27. (b) $\frac{M}{L} = \frac{e}{2m_e} = \frac{1}{2} \times$ Specific charge of an electron

28. (c) Al, Ni, Cu, Co

29. (a) $\frac{1}{15} = \left(\frac{3}{2} - 1\right)\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$

$$\frac{1}{f} = \left(\frac{3/2}{4/3} - 1\right)\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$$

$$\frac{1}{f} = \frac{1}{8} \times \frac{2}{15} = \frac{1}{60}$$

$f = 60$ cm

30. (b) $t = \frac{d}{v} = \frac{\mu d}{c}$

$= \frac{1.5 \times 4 \times 10^{-2}}{3 \times 10^{8}}$

31. (c) $\frac{f_0}{f_e} = 15$

$= f_0 + f_e = 96$

$= f_0 + \frac{f_0}{15} = 96$

$= \frac{16 f_0}{15} = 96$

$f_0 = 90$ cm

32. (d) $KE_1 = 2 - 0.5 = 1.5eV$

$KE_2 = 2.5 - 0.5 = 2.0eV$

$\frac{V_1}{V_2} = \sqrt{\frac{KE_1}{KE_2}}\sqrt{\frac{15}{20}} = \frac{\sqrt{3}}{2}$

33. (a) $\lambda = \frac{h}{\sqrt{2mK_1}}$

$= 2\lambda = \frac{h}{\sqrt{2mK_2}}$

$= \frac{1}{2} = \sqrt{\frac{K_2}{K_1}}$

$= K_2 = \frac{K_1}{4}$

34. (b)

$Emf = \frac{Bw\ell^2}{2}$

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

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

35. (c)

$\Delta Q = \frac{|\Delta\phi|}{R} = \frac{NBA - 0}{R}$

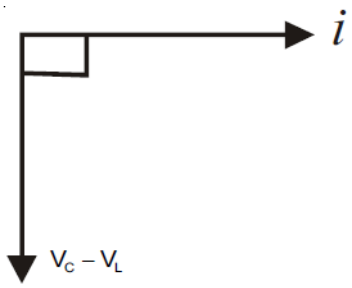
$= \frac{25 \times 0.02 \times 200 \times 10^{-4}}{1}$

$= 10^{-2} = 0.01C$

36. (b) JWL, WL = Reactance

$$= [WL] = [R] = \left[\frac{ML^2\ T^{-2}}{[Q][Q]}\right][T]$$
$$= [ML^2\ T^{-1}Q^{-2}]$$

37. (c)



38. (a) $Q = \frac{W_0 L}{R}$

$$W_0 = \frac{1}{\sqrt{LC}}$$

$$= Q = \frac{100}{3} \times \frac{9}{10} = 30$$

39. (b) $\sqrt{\mu_r \varepsilon_r}$ is a dimension less quantity

40. (d) $E_0 \propto \frac{1}{r}$

Chemistry

41. (d) The complex which have highest oxidation state on central atom and strong field ligand is the most stable.

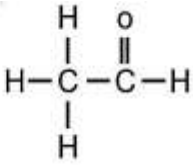
42. (b) In complex, $K[Co(OX)_2(NH_3)_2]$;

Primary Valency = Oxidation state on central atom, i.e., co is in +3 oxidation state.

Secondry = oxidation state on central atom, i.e., Co is in +3 oxidation state.

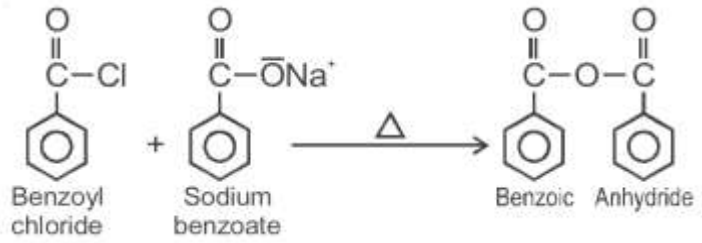
43. (d) $Ma_3\ b_3$ shows facial and meridional isomers so $[Co(NH_3)_3Cl_3]$

44. (a) There must be $\alpha -$ H-atoms for aldol condensation.

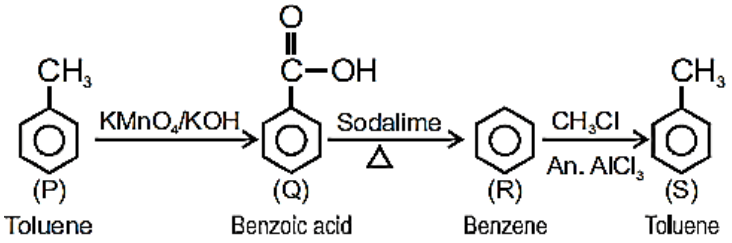
$\therefore$ in acetaldehyde, i.e.,  there are

$3 - \alpha -$ H-atoms

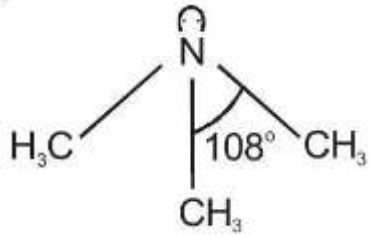
45. (a)



46. (b)



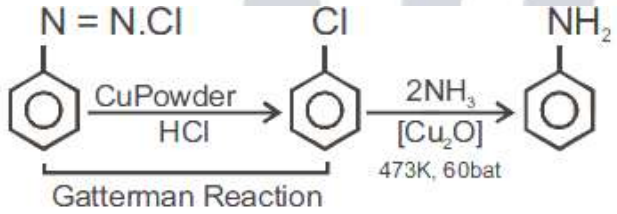
47. (d) In trimethyl amine, $((CH_3)_3\ N)$



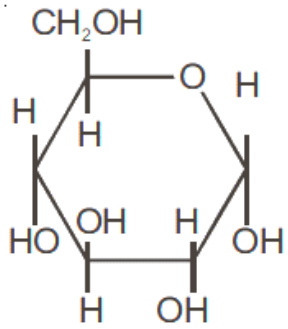
Hybridisation $= SP^3$

Bond angle: $108°$

48. (d)



49. (c) Glucose in the form of $\alpha - D$ - Glucopyranose



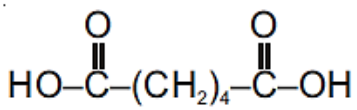
50. (a) Myosin protein present in muscle is insoluble in water

51. (d) (i), (iv) are true statements

(ii), (iii) are false statements

52. (d)

53. (c) Adipic acid has the property of flexibility, i.e.



54. (d) Cellulose diacetate is semisynthetic polymer

55. (b) The packing efficiency of arrangement in BCC unit cell is $\frac{\sqrt{3}\pi}{8}$, i.e. 68%

56. (c) AgBr shows both schottky and frenkel defects

57. (c)

$K_3[Fe(CN)_6] \rightarrow 3\ K^+_{(aq)} + [Fe(CN)6]^{3-}_{(aq)}$

t = o	1		
t = t	1–α	3α	α

$$i = \frac{1 - \alpha + 3\alpha + \alpha}{1}$$

$$i = 1 + 3\alpha$$

$$i = 1 + 3(0.778)$$

$$i = 3.334$$

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

$\Delta T_b = D.16K, m = 0.05$

$\therefore 0.16 = K_b(0.05)$

$$K_b = 3.2\ K\frac{kg}{mol}$$

59. (c) Molality has no volume term in its expression so it will not change with the change in temperature

60. (a) Daniel cell involves oxidation of Zn and Reduction of $Cu^{2+}_{(aq)}$ ions

$Zn(s)|Zn^{2+}_{(aq)}(1M)||Cu^{2+}_{(aq)}(1M)|Cu(s)$

61. (c) For 1 mole electrons:

mass of Al, Ag, Mg $= \frac{1}{3}:\frac{1}{1}:\frac{1}{2}$

$= 2:6:3$

62. (a) At 150 K, ceramic materials behave as super conductors.

63. (c)

Iorn pyrites: FeS_2

Magnetile : Fe_3O_4

Siderite: $FeCO_3$

Haematile: Fe_2O_3

64. (b) Stability of Hydrides decreases down the group $\therefore NH_3$ is most stable.

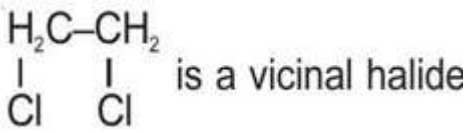
65. (a) P has oxidation state of +5 in $H_4P_2O_7$

P has oxidation state of +3 in H_3PO_3

66. (a) Correct order of acidic strength:

$HClO_4 > HClO_3 > HClO_2 > HClO$

67. (c)

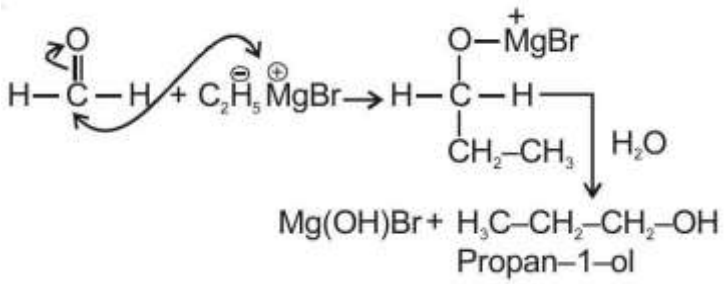


68. (b) Polarimeter is used to determine d and I-configuration of compounds

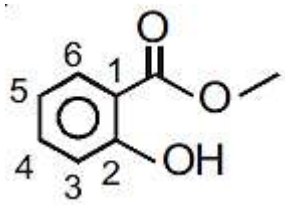
69. (b)

70. (a) Butan - 1-ol has highest Boiling point due to least no. of Branches and high molecular mass.

71. (b)



72. (b) Methyl salicylate:



IUPAC name: Methyl-2-hydroxy benzoate

73. (c) $3A + 2B \rightarrow 5C$

$$= -\frac{1}{3}\frac{dA}{dt} = -\frac{1}{2}\frac{dB}{dt} = +\frac{1}{5}\frac{dc}{dt}$$

74. (b) For A → B

Rate law $= K[A]^{1/2}$

If concentration is increase 9 times and Rate by 3 times so order of reaction must be $1/2$

75. (c)
76. (b) Coagulation
77. (d)

(A) Hydrolysis reaction

(B) By Oxidation of H_2 S

(C) By Reduction of $AuCl_3$

(D) By Double decomposition

78. (c) The ion having same unpaired has similar magnetic moment

Fe^{3+}: [Ar]3 d^5

5 unpaired electrons

Mn^{2+}: [Ar]3 d^5

5 unpaired electrons

79. (c)
80. (b) In complex, $[NiCl_4]^{2-}$ it forms teltrahedral complex so energy of eg set $< t_2$ g set of orbitals

$\therefore dxy \cong dyz \cong dzx > dx^2 - y^2 \cong dz^2$

Mathematics

81. (b) Area $= a^2 \sin\theta = A$

$= \frac{dA}{Da} = 2a\sin\theta\, a$

$= \sin\theta = \frac{1}{2}$

$\therefore$ Angles are

$\frac{\pi}{6}$ and $\frac{5\pi}{6}$

82. (d) $f(x) = 5^x, x = 2, \Delta x = .01$

Now $f(x + \Delta x) = f(x) + f'(x)\Delta x$

$f(5^{2.01}) = 25 + \left((5^2 \log 5) \times .01\right)$
$= 25.40237 \approx 25.4024$

83. (c) $f(x) = \frac{x}{\log x^e} = x\log_e x (x \neq 1)$

$f'(x) > 0 \Rightarrow \log x + 1 > 0$

$\Rightarrow \log_e x > -1$

$\Rightarrow x > \frac{1}{e}; (x \neq 1)$

$\Rightarrow \left(\frac{1}{e}, 1\right) \cup (1, \infty)$

84. (a) $\int (2 + \log x)(ex)^x dx$

Now, $(ex)^x = t$

$\Rightarrow x\log(ex) = \log t$

$\Rightarrow x(1 + \log x) = \log t$

$\Rightarrow (1 + (\log x + 1))dx = \frac{1}{t}dt$

$\Rightarrow (2 + \log x)(ex)^x dx = dt$

$\therefore \int dt = t + c = (ex)^x + c$

85. (a) $\int e^{\sqrt{x}} dx\, \sqrt{x} = t;\ dx = 2tdt$

$\Rightarrow 2\int e^t t dt$

$\Rightarrow 2[e^t t - e^t]$

$\Rightarrow 2e\sqrt{x}[\sqrt{x} - 1] + c$

86. (a)

$\int \frac{\sin x}{\sin(x - \alpha)} dx$

$\Rightarrow \int \frac{\sin(x - \alpha + \alpha)}{\sin(x - \alpha)} dx$

$\Rightarrow \int (\cos\alpha + \sin\alpha \cot(x - \alpha))dx$

$\Rightarrow x(\cos\alpha) + \sin\alpha \cdot \log(|\sin(x - \alpha)|) + c$

$p = \cos\alpha$

$q = -\sin\alpha$

$\therefore pq = \frac{-1}{2}\sin 2\alpha$

87. (b)

$\int_1^3 \left(\frac{x^2 + 1}{4x}\right)^{-1}$

$\Rightarrow \int_1^3 \left(\frac{4x}{x^2 + 1}\right) dx$

$\Rightarrow x^2 + 1 = t \Rightarrow 2xdx = dt$

$\int_2^{10} \frac{2dt}{t} \Rightarrow 2(\log 10 - \log 2)$

$\Rightarrow \log 25$

88. (a) $\int_1^k (2x-3) = 12$

$\Rightarrow [x^2 - 3x]_1^k = 12$

$\Rightarrow (K^2 - 3K) - (1-3) = 12$

$\Rightarrow K^2 - 3K + 2 - 12 = 0$

$\Rightarrow K^2 - 3K - 10 = 0$

$\Rightarrow K = 5, -2$

("dx" is not mention in question)

89. (a)

$I = \int_{-\pi/2}^{\pi/2} \frac{\cos^2 2x}{1+25^x} dx$

$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\cos^2(2x)}{1+25^{-x}} dx$

$\left[\int_a^b f(x)dx = \int_a^b f(a+b-x)dx\right]$

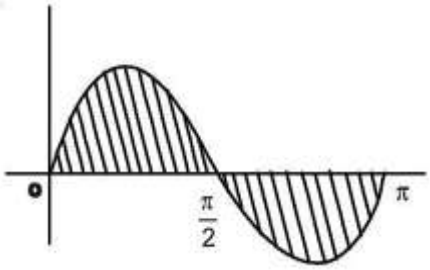
add,

$2I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos^2(2x)dx$

$2I = 2\int_0^{\frac{\pi}{2}} \cos^2(2x)dx$

$I = \int_0^{\frac{\pi}{2}} \left(\frac{1+\cos 4x}{2}\right) dx = \frac{\pi}{4}$

90. (c) $y = \sin 2x$ $(x = 0$ to $x)$



$$\Rightarrow \text{Area} = 2\int_0^{\frac{\pi}{2}} \sin(2x)dx$$

$$= 2\left[-\frac{\cos 2x}{2}\right]_0^{\frac{\pi}{2}}$$

$$= -[-1-1]$$

$$= 2$$

91. (c) Area of ellipse is π ab

$$\Rightarrow \frac{x^2}{\left(\frac{1}{\sqrt{2}}\right)^2} + \frac{y^2}{\left(\frac{1}{\sqrt{3}}\right)^2} = 1$$

$$\Rightarrow \text{Area} = \pi\left(\frac{1}{\sqrt{2}}\right)\left(\frac{1}{\sqrt{3}}\right) = \frac{\pi}{\sqrt{6}}$$

92.(b)

$$\frac{dy}{dx}(1+x) - xy = 1 - x$$

$$\Rightarrow \frac{dy}{dx} - \frac{x}{1+x}y = (1-x)$$

$$\text{I.F.} = e^{-\int \frac{x}{1+x}dx}$$

$$= (1+x)e^{-x}$$

93. (d)

$$y = a_1(a_2 + a_3) \cdot \cos(x + a_4) - a_5 e^{x+a_6}$$

$$\Rightarrow y = A_1\cos(x + a_4) - A_2 e^x$$

Order is 3

94. (d) For parabola, length of subnormal is

constant $\quad\quad\quad\quad$ $\therefore e = 1$

95. (c)

$$|\vec{x} + \vec{y}|^2 + |\vec{x} - \vec{y}|^2 = 2(|\vec{x}|^2 + |\vec{y}|^2)$$

$$\therefore |\vec{x} - \vec{y}| = \sqrt{3}$$

96. (d) Now $\vec{x} = (4, -4, 2)$

$\vec{y} = (1, 1, -1)$

$$\Rightarrow 36 + 4(c) + 4(4 - 4 - 2) = |\vec{x} + 2\vec{y}|^2$$

$$\Rightarrow |\vec{x} + 2\vec{y}| = 2\sqrt{10}$$

97. (a) Area of parallelogram $= |a \times b|$

$= |a||b||\sin\theta|$

$= 3 \times (2 \times 3) \times \frac{1}{2}$

$= 9$

98. (d)

99. (c) $\sin\theta = \frac{4-4+1}{3\times3} = \frac{1}{9}$

$= \tan\theta = \frac{1}{\sqrt{80}} = \frac{1}{4\sqrt{5}}$

$\theta = \tan^{-1}\frac{1}{4\sqrt{5}}$

100. (d) Midpoint will lie on plane $= (2,4,1)$

And D. R. of Normal to the plane is $(1,2,-2)$

Now equation of pane is given by

$a(x-x_1) + b(y-y_1) + c(z-z_1) = 0$

$= 1(x-2) + 2(y-4) - 2(z-1) = 0$

$= x - 2 + 2y - 8 - 2z + 2 = 0$

$= x + 2y - 2z - 8 = 0$

101. (b) $f'(x) = 2x + 3$, As this depends on x ⇒ many-one Here Range $= \left[\frac{7}{4}, \infty\right) \neq CO - \text{domain}$ ⇒ Not onto

Alternative method

A parabola is many-one and not onto from R → R

102. (d) $a * b = \frac{ab}{10}$

Identity element $= 10$

Now Inverse $= \frac{100}{a}$

$5 * 8 = \frac{5\times8}{10} = 4 = a$

$\therefore$ inverse $= \frac{100}{4} = 25$

103. (c) Function is not bijective

⇒ Inverse does not exists

104. (a) $\sin^2\left(\sin^{-1}\left(\frac{1}{2}\right)\right) + \tan^2(\sec^{-1}2) + \cot^2(\text{cosec}^{-1}4)$

$= \frac{1}{4} + 3 + 15$

$= \frac{73}{4}$

105. **(c)**

$\tan\left(\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right)$

$= \tan\left(\tan^{-1}\left(\frac{\frac{3}{4}+\frac{2}{3}}{1-\frac{1}{2}}\right)\right)$

$= \tan\left(\tan^{-1}\left(\frac{17}{6}\right)\right) = \frac{17}{6}$

106. **(a)** $\cos\left(\cot^{-1}\left(\operatorname{cosec}\left(\cos^{-1} a\right)\right)\right)$

$= \cos\left(\cot^{-1}\left(\frac{1}{\sqrt{1-a^2}}\right)\right)$

$= \cos\cos^{-1}\left(\frac{1}{\sqrt{2-a^2}}\right)$

$= \frac{1}{\sqrt{2-a^2}}$

107. **(c)** $\begin{vmatrix} \sin^2\theta & \cos^2\theta \\ -\cos^2\theta & \sin^2\theta \end{vmatrix}$

$= \sin^4\theta + \cos^4\theta$

$= 1 - 2\sin^2\theta\cos^2\theta$

$= 1 - \frac{\sin^2 2\theta}{2}$

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

$= \frac{1}{2}(1 + \cos^2 2\theta)$

108. **(d)**

$\begin{vmatrix} 1! & 2! & 3! \\ 2! & 3! & 4! \\ 3! & 4! & 5! \end{vmatrix} = 12\begin{vmatrix} 1 & 2 & 6 \\ 1 & 3 & 12 \\ 1 & 4 & 20 \end{vmatrix}$

$= 24 = 2016k$

$k = \frac{1}{84}$

109. **(a)**

$$\begin{vmatrix} 1+x & 1 & 1 \\ 1+y & 1+2y & 1 \\ 1+z & 1+z & 1+3z \end{vmatrix}$$

$$= (10k)xyz\left(3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$$

$$xyz\begin{vmatrix} \frac{1}{x}+1 & \frac{1}{x} & \frac{1}{x} \\ \frac{1}{y}+1 & \frac{1}{y}+2 & \frac{1}{y} \\ \frac{1}{z}+1 & \frac{1}{z}+1 & \frac{1}{z}+3 \end{vmatrix}$$

$$= xyz\left(3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)\begin{vmatrix} 1 & 1 & 1 \\ \frac{1}{y}+1 & \frac{1}{y}+2 & \frac{1}{y} \\ \frac{1}{z}+1 & \frac{1}{z}+1 & \frac{1}{z}+3 \end{vmatrix}(R_1 \to R_1+R_2+R_3)$$

$$= 2xyz\left(3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)(C_2 \to C_2-C_1 \text{ and } C_3 \to C_3-C_1)$$

$$\Rightarrow k=\frac{1}{5}$$

110. (b)

$$A=\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$$

$$A^{-1}=\frac{1}{5}\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & \alpha \\ 2 & 2 & -3 \end{bmatrix}$$

$$\Rightarrow \alpha = 2$$

111. (d) $|A_r| = (2r-1)$

$$= \sum_{r=1}^{100}(2r-1)$$

$$= 10000 = 10^4 = (\sqrt{10})^8 = (\sqrt{10})^k$$

$$= k = 8$$

112. (b)

$$\frac{d}{dx}\left(-\cos\left(\frac{\pi}{2}+3x^0\right)\right)$$

$$\frac{d}{dx}(\sin(3x^0))$$

$$=\frac{\pi}{60}\cos(3x^0)$$

113. (c)

$$f'(x) = 1+2x+3x^2+\ldots\ldots\ 1000x^{999}$$

$= f'(-1) = 1 - 2 + 3 - 4 + 5. \ldots\ldots -1000$

$= -500$

114. (c)

$f'(c) = \dfrac{f(b) - f(a)}{b - a}$

$a = 1$

$b = e$

$= \dfrac{1}{x} = \dfrac{1 - 0}{e - 1}$

$= x = e - 1$

115. (d)

116. (c)

$\int \dfrac{1 + \cos x}{\cos x(1 - \cos x)} \ldots\ldots\ldots\ldots dx$

$= \int \left(\dfrac{1}{\cos x} + \dfrac{2}{1 - \cos x}\right) dx$

$\int \left((\sec x) + 2(\operatorname{cosec}^2 x + \cot x \cdot \operatorname{cosec} x)\right) dx$

$= \log(|\sec x + \tan x|) - 2\cot x - 2\operatorname{cosec} x + c$

$\therefore f'(x) = \cot x + \operatorname{cosec} x$

$f'(x) = \cot\left(\dfrac{x}{2}\right)$

$\therefore f(x) = 2\log\left(\left|\sin\left(\dfrac{x}{2}\right)\right|\right)$

117. (c) $1 - (.4)^3$

$= 0.936$

118. (a) $P\left(\dfrac{A'}{B}\right) = \dfrac{P(A' \cap B)}{P(B)}$

$= \dfrac{P(B) - P(A \cap B)}{P(B)}$

$== 1 - \dfrac{P(A \cap B)}{P(B)}$

Now $P(A) = \frac{1}{6}$

$P(B) = \dfrac{1}{8}$

$P(A \cap B) = \frac{1}{14}$

$\therefore 1 - \frac{\frac{1}{14}}{\frac{1}{8}}$

$= \frac{3}{7}$

119. **(c)** mean $= np = 6$; varience $= npq = 3$

$\therefore q = \frac{1}{2}$

$\therefore p = \frac{1}{2}$

$\therefore n = 12$

$\sum_{r=0}^{1} {}^{12}C_r \left(\frac{1}{2}\right)^r \left(\frac{1}{2}\right)^{12-r}$

$= \left(\frac{1}{2}\right)^{12} + 12 \times \frac{1}{2} \times \left(\frac{1}{2}\right)^{11}$

$= \left(\frac{1}{2}\right)^{12} [1 + 12]$

$= \frac{13}{4096}$

120. **(b)** Maximum of objective functions

$z = 60x + 10y$ is obtained at $(10,0)$

$\therefore (z)_{maximum}$

$= 600$

Biology

121. **(c)**
122. **(c)**
123. **(d)**
124. **(b)**
125. **(c)**
126. **(c)**
127. **(b)**
128. **(b)**
129. **(d)**
130. **(b)**
131. **(c)**
132. **(b)**
133. **(c)**

134. (b)
135. (c)
136. (c)
137. (a)
138. (c)
139. (a)
140. (c)
141. (b)
142. (d)
143. (a)
144. (c)
145. (b)
146. (d)
147. (c)
148. (d)
149. (c)
150. (d)
151. (b)
152. (b)
153. (a)
154. (a)
155. (c)
156. (d)
157. (c)
158. (a)
159. (b)
160. (b)