SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

SR OUTGOING (EAMCET) | **EAMCET (ENGG) TOT G.T – 19** | **Date: 27-08-2020**

Time: 3 Hour | **Max. Marks: 160 M**

KEY SHEET

MATHS – A

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

MATHS – B

41	4	42	1	43	2	44	3	45	2	46	1	47	4	48	3	49	2	50	3
51	1	52	4	53	3	54	2	55	1	56	3	57	4	58	2	59	2	60	3
61	1	62	2	63	3	64	3	65	1	66	2	67	4	68	1	69	2	70	1
71	2	72	1	73	1	74	3	75	4	76	2	77	1	78	2	79	4	80	2

PHYSICS

81	2	82	1	83	2	84	4	85	2	86	2	87	4	88	2	89	3	90	2
91	3	92	2	93	1	94	3	95	2	96	2	97	3	98	4	99	2	100	3
101	2	102	2	103	4	104	2	105	1	106	3	107	2	108	1	109	1	110	4
111	4	112	3	113	1	114	4	115	1	116	3	117	2	118	2	119	4	120	4

CHEMISTRY

121	4	122	3	123	2	124	2	125	1	126	1	127	2	128	3	129	3	130	1
131	2	132	3	133	4	134	3	135	1	136	2	137	1	138	4	139	4	140	1
141	2	142	1	143	3	144	3	145	1	146	2	147	4	148	1	149	3	150	4
151	2	152	3	153	2	154	1	155	1	156	4	157	3	158	3	159	3	160	1

HINTS AND SOLUTIONS

MATHS-A

1. $f(x)=5x-3, g(x)=x^2+3$

$f^{-1}(x)=\frac{x+3}{5}, (gof^{-1})(3)=$

$g\left(\frac{6}{5}\right)=\frac{36}{25}+3=\frac{111}{25}$

2. $f(x+y)=f(x).f(y)\Rightarrow f(x)=k^x$

$f(5)=k^5=32=2^5$

$\Rightarrow k=2$

Then $f(7)=2^7=128$

3. Put $n=1\Rightarrow 2^3-7-1=0$

Put $n=2\Rightarrow 2^6-14-1=49$

Put $n=3\Rightarrow 2^9-21-1=490$

G.C.D of 49, 490 is 49

4. $\sum n(n+1)(n+2)$

(OR)

Put $n=1$ and verify the options

5. By matrix multiplication

6. Put $a=1,\ b=2, c=3$

7. $|A|=-8$

$\therefore |adi\,A| = |A|^{n-1} = (-8)^{3-1} = 64$

8. $\dfrac{-(\bar{a}+\bar{b}-\bar{c})}{|\bar{a}+\bar{b}-\bar{c}|}$

9. $\begin{vmatrix} 5 & 6 & 7 \\ 7 & -8 & 9 \\ 3 & 20 & 5 \end{vmatrix} = 0$

Given vectors are coplanar

10. $(\bar{a}\times\bar{b})^2 + (\bar{a}.\bar{b})^2 = |\bar{a}|^2.|\bar{b}|^2$

11. Let $\bar{a} = \bar{i}$, $\bar{b} = \bar{j}$, $\bar{c} = \bar{k}$

12. Put $A = B = C = 30^0$

$\Rightarrow \dfrac{9}{4} = 2 + \dfrac{k}{8} = \dfrac{k}{8} \Rightarrow k = 2$

13. $\dfrac{1}{8^{1-|\cos x|}} = 8^2 \Rightarrow \dfrac{1}{1-|\cos x|} = 2$

$\Rightarrow 2(1-|\cos x|) = 1 \Rightarrow |\cos x| = \dfrac{1}{2}$

$\Rightarrow \cos x = \dfrac{1}{2}$

$\Rightarrow x = \pm\dfrac{\pi}{3}, \pm\dfrac{2\pi}{3}$

14. $Tan^{-1}\left(\dfrac{2x+3x}{1-2x.3x}\right) = \dfrac{\pi}{4}$

$\Rightarrow \dfrac{5x}{1-6x^2} = 1 \Rightarrow 6x^2 + 5x - 1 = 0$

$\Rightarrow x = \dfrac{1}{6}$

15. $\cos^{-1}\left[\dfrac{1}{\sqrt{2}}\left(\cos\dfrac{9\pi}{10} - \sin\dfrac{9\pi}{10}\right)\right] =$

$\cos^{-1}\left[\cos\dfrac{\pi}{4}.\cos\dfrac{9\pi}{10} - \sin\dfrac{\pi}{4}\sin\dfrac{9\pi}{10}\right]$

$= \cos^{-1}\left[\cos\left(\dfrac{\pi}{4}+\dfrac{9\pi}{10}\right)\right] = \cos^{-1}\left(\cos\left(\dfrac{23\pi}{20}\right)\right)$

$= \cos^{-1}\left(\cos\left(2\pi - \dfrac{17\pi}{20}\right)\right)$

$= \cos^{-1}\left(\cos\left(\dfrac{17\pi}{20}\right)\right)$

$= \dfrac{17\pi}{20}$

16. $e^x = \tan\left(\dfrac{\pi}{4}+\dfrac{\theta}{2}\right) = \dfrac{1+\tan\dfrac{\theta}{2}}{1-\tan\dfrac{\theta}{2}}$

$\Rightarrow \cosh x = \dfrac{e^x + e^{-x}}{2}$ simplify

17. $c\left[\dfrac{s(s-b)}{ac}\right] + b\left[\dfrac{s(s-c)}{ab}\right] = \dfrac{s}{a}[s-b+s-c]$

$= s$

18.

$\dfrac{b^2+c^2-a^2}{abc} + \dfrac{a^2+c^2-b^2}{2abc} + \dfrac{a^2+b^2-c^2}{abc} = \dfrac{a^2+b^2}{abc}$

$\Rightarrow b^2 + c^2 = a^2 \Rightarrow \angle A = 90^0$

19. $\dfrac{1}{r^2} + \dfrac{1}{r_1^2} + \dfrac{1}{r_2^2} + \dfrac{1}{r_3^2} = \dfrac{a^2+b^2+c^2}{\Delta^2}$

20. $a^2 + b^2 = c^2$

$\Rightarrow \sin^2 A + \sin^2 B = \sin^2 C$

$\therefore \dfrac{a^2-b^2}{a^2+b^2} = \dfrac{\sin^2 A - \sin^2 B}{\sin^2 A + \sin^2 B} = \sin(A-B)$

21. $\dfrac{2-i}{(1-2i)^2} = \dfrac{2-i}{-3-4i} = \dfrac{-2+11i}{25}$

Conjugate complex $= \dfrac{-2}{25} - i\dfrac{11}{25}$

22. $Z = i\log\left(2+\sqrt{3}\right)$

$iZ = -\log\left(2+\sqrt{3}\right)$

$e^{iZ} = \left(2+\sqrt{3}\right)^{-1} = 2-\sqrt{3}$

$\cos Z = \dfrac{e^{iZ} + e^{-iZ}}{2} = 2$

23. $x + iy = (5+3i)^3$

$x + iy = -10 + 198i$

$x = -10, y = 198$

$3x + 5y = -30 + 990 = 960$

24. $x = 2^{\frac{1}{3}}$

$x = 2^{\frac{1}{3}}, 2^{\frac{1}{3}}w, 2^{\frac{1}{3}}w^2$

$\alpha = 2^{\frac{1}{3}}w, \beta = 2^{\frac{1}{3}}w^2$

$\alpha^6 = 4, \beta^6 = 4, \alpha^6 + \beta^6 = 4 + 4 = 8$

25. $x^2 - 4x + 5 = x - 1$ $\left(a^{\log_a^x} = x\right)$

$x^2 - 5x + 6 = 0$

$(x-2)(x-3) = 0$

26. $\angle P + \angle Q + \angle R = 180, \angle R = 45^0$

$\tan\left(\dfrac{P}{3}\right) + \tan\left(\dfrac{Q}{3}\right) = -\dfrac{b}{a}$

$\tan\left(\frac{P}{3}\right)\tan\left(\frac{Q}{3}\right)=\frac{c}{a}$

27. Let the roots are $a-2,\ a,\ a+2$

$S_1=3a=9$

$a=3$

$S_3=a\left(a^2-4\right)=-l$

$l=-15$

3 is root of $x^3-9x^2+kx+l=0$

$27-81+3k-15=0$

$k=23$

28. $1+1.1!+2.2!+3.3!+....+n.n!$

$=1+(2-1)1!+(3-1)2!+....+(n+1-1)n!$

$=1+2!-1!+3!-2!+.....+(n+1)!-n!$

$=(n+1)!$

29. $98=2^1\times7^2$

Req no $=\frac{(1+1)(2+1)}{2}=3$

30. Sum of all 4 digit no

$={}^4P_3\times(1111)\times(2+3+4+5+6)$

=5, 33,280

31. No.of rational terms $=\left[\frac{100}{lcm\ of\ (4,5)}\right]+1$

$=\left[\frac{100}{20}\right]+1=6$

32. Differentiate and Put $x=-1$

33. $(a+bx)^{-3}=\frac{1}{a^3}\left(1+\frac{b}{a}x\right)^{-3}=\frac{1}{27}+\frac{x}{3}+....$

$\Rightarrow\frac{1}{a^3}\left(1-\frac{3b}{a}x+....\right)=\frac{1}{27}+\frac{x}{3}+....$

$\Rightarrow\frac{1}{a^3}=\frac{1}{27}\Rightarrow a=3$

$\frac{-3b}{a^4}x=\frac{x}{3}\Rightarrow\frac{-3b}{81}=\frac{1}{3}\Rightarrow b=-9$

$(a,b)=(3,-9)$

34. $x+1=A(3x+1)+B(2x-1)$

35. $\bar{x}=\frac{6+7+10+12+13+\alpha+17+16}{8}=10$

$\alpha=4$

M.D$=\frac{\sum|x_i-\bar{x}|}{n}=3.25$

36. No.of days =29=4 weeks+1 day

$n(E)=1, n(s)=7$

$P(E)=\frac{1}{7}$

37. $\frac{{}^4C_2+{}^4C_3+{}^4C_4}{2^4}=\frac{11}{16}$

38. $P(A)=\frac{1}{4},\ P\left(\frac{A}{B}\right)=\frac{1}{4},\ P\left(\frac{B}{A}\right)=\frac{1}{2}$

$\frac{P(A\cap B)}{P(B)}=\frac{1}{4},\ \frac{P(A\cap B)}{P(A)}=\frac{1}{2}$

$P(A\cap B)=\frac{1}{8},\ P(B)=\frac{1}{2}$

I: $P\left(\bar{A}/\bar{B}\right)=\frac{1-P(A\cup B)}{1-P(B)}=\frac{1-5/8}{\frac{1}{2}}=\frac{3}{4}$

II: Wrong

III:

$A(A/B)+P\left(A/\bar{B}\right)=\frac{P(A\cap B)}{P(B)}+\frac{P\left(A\cap\bar{B}\right)}{P\left(\bar{B}\right)}=\frac{1}{2}$

Only I is correct

39. $\sum x_iP(x=x_i)=1.3$

$\sum P(x=x_i)=1$

40. $P(X=0)=0.8$

$\lambda=\log_e\frac{5}{4}$

MATHS – B

41. Area of $\Delta^{le}=\frac{c^2}{2|ab|}$

42. $xy+4x-3y-12=0$

$x=3,\ y=-4$

Req points $A(-4,-4)\ \ B(3,-4),$

$C(3,3), D(-4,3)$

Eq. of $AC\ =\ y-y_1=\frac{y_2-y_1}{x_2-x_1}(x-x_1)$

$x-y=0$ ..... (1)

Eq of BD $=y-y_1=\frac{y_2-y_1}{x_2-x_1}(x-x_1)$

$x+y+1=0$ .....(2)

Combined eq of (1) & (2)

$(x-y)(x+y+1)=0\ \Rightarrow\ x^2-y^2+x-y=0$

43. $\lim_{y\to1}\left[\frac{1}{y^2-1}-\frac{2}{\left(y^2-1\right)\left(y^2+1\right)}\right]$

$\lim_{y\to1}\left[\frac{y^2+1-2}{\left(y^2-1\right)\left(y^2+1\right)}\right]=\lim_{y\to1}\frac{y^2-1}{\left(y^2-1\right)\left(y^2+1\right)}=\frac{1}{1+1}=\frac{1}{2}$

44. $y=\tan^{-1}\left(\frac{1-\log x^2}{1+\log x^2}\right)+\tan^{-1}\left(\frac{2+\log x^2}{1-2\log x^2}\right)$

$y=\tan^{-1}(1)-\tan^{-1}\left(\log x^2\right)+\tan^{-1}(2)+\tan^{-1}\left(\log x^2\right)$

$y=\tan^{-1}(1)+\tan^{-1}(2)$

$\frac{dy}{dx}=0$

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

46. Req normal equation $y-y_1=-\frac{1}{m}(x-x_1)$ on y-axis, put $x=0$

47. $f(x)$ is continuous but not differentiable in $[-1,1]$

$f(x)=|x|$

$f^1(x)=\frac{|x|}{x}$

$f^1(0^+)=1\ ;\ f^1(0^-)=-1$

48. Verify the options

49. $l=m=n$

$l^2+m^2+n^2=1$

$3l^2=1$

The angle mode by the line with $y-$axis=

$\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$

50. $m_1=4\ ;\ m_2=\frac{k}{5}$

$\tan\theta=\left|\frac{m_1-m_2}{1+m_1m_2}\right|$

$\tan 45^0=\left|\frac{4-\frac{k}{5}}{1+\frac{4k}{5}}\right|$

$5k=15\Rightarrow k=3$

51. $\frac{d}{dx}\left(\sin^{-1}x+\sin^{-1}\sqrt{x}\right)$

52. $k=\lim_{x\to 0}\frac{\left(9^x-1\right)\left(4^x-1\right)}{2\sin^2\left(\frac{x}{4}\right)}=\frac{\log 9\log 4}{2\left[\frac{1}{16}\right]}$

53. $\theta=\tan^{-1}\left(\frac{a}{b}\right)$

54. Area $A=\pi r^2+\pi r\sqrt{r^2+h^2}$

$\delta A=0+\pi r\left[\frac{1}{2\sqrt{r^2+h^2}}2h\delta h\right]=\frac{\pi rh\alpha}{\sqrt{r^2+h^2}}$

55. $|PA-PB|=6$ and

Use $\frac{4(x-a)^2}{k^2-4b^2}+\frac{4y^2}{k^2}=1$

Where $k=6;\ a=0$ and $b=4$

56. Let $f(x)=\sin x$

$f^1(x)=\cos x$

$f^1(x)=0\Rightarrow\cos x=0\Rightarrow x=\frac{\pi}{2}$

$\therefore$ stationary point $(x,y)=\left(\frac{\pi}{2},\sin\frac{\pi}{2}\right)$

$=\left(\frac{\pi}{2},1\right)$

57. Slope of $AB=1$

$A(2,0)\ \ m=\tan 60^0=\sqrt{3}$

Eq of AC is $y=\sqrt{3}(x-2)$

58. Given Curve $y=a^{1-k}.x^k$

$\frac{dy}{dx}=k.a^{1-k}.x^{k-1}$

Length of subnormal $=|ym|=\left|k.a^{2-2k}x^{2k-1}\right|$

Length of subnormal is constant $\Rightarrow 2k-1=0$

$k=\frac{1}{2}$

59. $\lim_{x\to\infty}\left(1+\frac{3}{x}\right)^{\frac{x}{2}}$

$e^{\lim_{x\to\infty}\left(\frac{3}{x}\right)\left(\frac{x}{2}\right)}=e^{\frac{3}{2}}$

60. $\frac{d}{dx}\left\{\log_7(\log x)\right\}$

$\frac{d}{dx}\left\{\frac{\log(\log x)}{\log 7}\right\}$

$\frac{1}{\log 7}\left[\frac{1}{\log x}.\frac{1}{x}\right]\Rightarrow\frac{1}{x\log x\log 7}$

61. $c=(r,0)$

$p=(b,c)$

$x^2+y^2-2rx=0$ it is passing (b,c)

We get $r=\frac{b^2+c^2}{2b}$

62. Polar is $s_1=0$

Compare with $2x+y-3=0$

63. $r=1\ \ c=(0,4)$

64. $\cos\theta=\frac{d^2-\left(r_1^2+r_2^2\right)}{2r_1r_2}$

65. $s-s^1=0$

66. Focus is $(-1,0)$ substitute in eq of line

67. $2a = n2b$
$a = nb$
Substitute a in $e = \sqrt{\frac{a^2 - b^2}{a^2}}$

68. $(x+1)(y+1) = 0$

69. $I_n = \frac{Sec^{n-2}xTanx}{n-1} + \frac{n-2}{n-1} I_{n-2}$

70. $-\int_2^3 (x^2 - 5x + 6)dx$

71. $\frac{dy}{dx} + \frac{2}{\frac{dy}{dx}} = 7 \qquad \left(\frac{dy}{dx}\right)^2 - 7\frac{dy}{dx} + 2 = 0$

72. IF $= e^{\int \frac{2}{x} dx} = x^2$
$y(I.F) = \int (I.F) Q dx$

73. Put $x = \tan\theta \;\; dx = \sec^2\theta d\theta$

74. Taking x^2 common from NR and DR
$\int \frac{1 - \frac{1}{x^2}}{\left(x + \frac{1}{x}\right)^2 - 2} dx$ put $x + \frac{1}{x} = t$

75. $ax \pm by \pm c = 0$ is $\frac{2c^2}{|ab|}$

76. $\frac{x^2}{9} - \frac{y^2}{4} = 1$
$9(m^2) - 4 = 4 \qquad m^2 = \frac{8}{9}$
$m = \pm\frac{2\sqrt{2}}{3}$

77. $\frac{2b^2}{a} = \frac{1}{2} \qquad \sin 2\alpha = \frac{1}{2}$

78. $a^{\frac{1}{3}}x + b^{\frac{1}{3}}y + (ab)^{\frac{2}{3}} = 0$

79. $2gg^1 + 2ff^1 = c + c^1$
$\lambda = 1$

80. $\frac{dx}{dy} + \frac{1}{y}x = x^2$
$\frac{1}{x^2}\frac{dx}{dy} + \frac{1}{y}.\frac{1}{x} = 1$
$\frac{1}{x} = z$

PHYSICS

81. $F_x = 2N, \;\; F_y = 1N$
$\vec{F} = 2i + j$
Slope $m = \tan\theta = \frac{y}{x} = \frac{1}{2}$
$\therefore 2y - x = 0$

82. $h^1 = \frac{3}{4}h \;\; (h = 16m)$
$= \frac{3}{4} \times 16 = 12m$

83. $H_{\max} = \frac{u^2}{2g}$
$10 = \frac{u^2}{2g}$
$u^2 = 196$
$R = \frac{u^2}{g} = \frac{196}{9.8} = 20m$

84. The Given
$\Delta Lst = \Delta LBr = \Delta L$
$Lst = L$
$LBr = (L-5)cm, t_2 = t_2 = t$
We know that
$Lst = \frac{\Delta Lst}{Lst \times t_1}$
$12 \times 10^{-6} = \frac{\Delta L}{L \times t}$ ……..(i)
$\alpha_{Br} = \frac{\Delta LBr}{LBr \times t_2}$
$18 \times 10^{-6} = \frac{\Delta L}{(L-5)t}$ …… (ii)
Dividing equations (1) by (ii) we get
$\frac{12 \times 10^{-6}}{18 \times 10^{-6}} = \frac{\frac{\Delta L}{L \times t}}{\frac{\Delta L}{(L-5) \times t}}$
$L = 15$
So, $LBr = L - 5$
$= 15 - 5 = 10\,\text{cm}$

85. Height dropped is independent of dropped mass

86. $\eta = \frac{dw}{dQ}$ but $\alpha = \frac{dQ_2}{dw} = \frac{Q_2}{Q_1 - Q_2}$
$\frac{1}{\alpha} = \frac{Q_1}{Q_2} - 1 \Rightarrow \frac{1}{\alpha} + 1 = \frac{Q_1}{Q_2}$

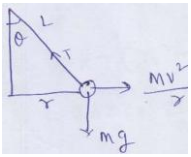
$$\Rightarrow \frac{\alpha+1}{\alpha}=\frac{Q_1}{Q_2}\Rightarrow \frac{Q_2}{Q_1}=\frac{\alpha}{1+\alpha}$$

$$\eta=\frac{Q_1-Q_2}{Q_1}=1-\frac{Q_2}{Q_1}$$

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

87. $s=\frac{v^2}{2\mu_k g}=\frac{20\times 20}{2\times 0.5\times 10}=40m$

88.



$$T\cos\theta=mg$$

$$T\sin\theta=\frac{mv^2}{r}$$

$$\tan\theta=\frac{v^2}{rg}$$

$$v=\sqrt{rg\tan\theta}$$

$$v=\sqrt{rg\times\frac{r}{\sqrt{l^2-r^2}}}=\sqrt{\frac{gr^2}{\sqrt{l^2-r^2}}}$$

89. $KE=\frac{1}{2}mv^2$

$v=u+at=at$

$KE\,\alpha\, t^2 \quad t=1s,\ 2s,\ 3s$

KE = 1 : 4 : 9

90. By conservation of momentum

$M\times 20=(M+m)v$

By work energy theorem

$$\frac{1}{2}M\times(20)^2-\frac{1}{2}(M+m)v^2=f\times 1cm$$

$$\therefore f=\frac{Mm}{M+m}\times 2\times 10^4 N$$

91. $V_{cm}=\frac{m_1v_1+m_2v_2}{m_1+m_2}$

$KE=\frac{1}{2}(m_1+m_2){V_{cm}}^2$

$V_{cm}=\frac{800}{36}$

$\therefore KE=\frac{400}{3}J$

92. ${V_L}^2-{V_n}^2=4gr$

${V_L}^2-\left(\sqrt{2}rg\right)^2=4gr$

$\therefore V_L=\sqrt{6rg}$

93. Energy α temperature

$KE=\frac{3}{2}KT$

$KE\,\alpha\, T$

$\frac{KE_1}{KE_2}=\frac{273+27}{273+127}=\frac{300}{400}=\frac{3}{4}$

94. $E=\frac{e^2Ay}{2l}$

$$20=\frac{\left(10\times10^{-2}\right)^2\times4\times10^{-6}\times y}{2\times40\times10^{-2}}$$

$y=4\times10^8 N/m^2$

95. P.E= Rotational K.E

96. $r_1=\frac{1}{\sqrt{\pi}},\ r_2=\frac{2}{\sqrt{\pi}}$

$w=8\pi T\left(r_2^2-r_1^2\right)$

$$=8\pi\times30\left(\frac{4}{\pi}-\frac{1}{\pi}\right)$$

$$=240\pi\left(\frac{3}{\pi}\right)=720\,ergs$$

97. $\frac{KE}{PE}=\frac{\frac{1}{2}k\left(A^2-x^2\right)}{\frac{1}{2}kx^2}=\frac{A^2-\frac{A^2}{N^2}}{\frac{A^2}{N^2}}=N^2-1$

98. $\frac{d^2x}{dt^2}=-\alpha x$

$a=-w^2x$

$\therefore w^2=\alpha$

$T=\frac{2\pi}{w}=\frac{2\pi}{\sqrt{\alpha}}$

99. $\frac{-GMm}{R}+\frac{1}{2}m\left(\frac{Ve}{2}\right)^2=\frac{-GMm}{R+h}$

$V_e=\sqrt{\frac{2GM}{R}}$

$\therefore h=\frac{R}{3}$

100. $p=\frac{10^6}{60}erg/\sec$

$F=10^3 dyne$

$t=\frac{1}{10}\sec$

$L=\frac{P.t}{F}=\frac{5}{3}cm$

101. $n=\frac{1}{2l}\sqrt{\frac{yA\alpha\Delta t}{\mu}}$

102. $n^1 = \left(\frac{v}{v - v_s \cos\theta}\right) n;\ \cos\theta = \frac{3}{5}$

103. $M = 2.5Am^2$

$w =$ change in K.E

$KE = K.E_{final} - K.E_{Intial} = KE_{Final}$

$w = MB_H\left[\cos\theta_1 - \cos\theta_2\right]$

$w = MBH\left[\cos 90 - \cos 0\right]$

$w = -MBH$

$= 2.5 \times 3 \times 10^{-5}$

$w = 7.5 \times 10^{-5} J = 75\mu J$

$\therefore K.E\ \ final = 75\mu J$

104. $r_n \alpha n^2$

$\frac{r_3}{r_1} = \frac{3^2}{1^2} =$

$r_3 = 9r_1 = 9 \times 0.53 = 4.77A^0$

105. $\frac{0.7}{0.5} = \frac{1.2 - w}{1 - w}$

$w = 0.5eV$

106. $c = n\lambda$ where c is the velocity of light

107. $E = \frac{v}{d}$

108. $np = ni^2$

$\Rightarrow p = \frac{ni^2}{n} = \frac{\left(2 \times 10^8\right)^2}{4 \times 10^{10}} = 10^6 m^{-3}$

109. $F \alpha Q$

110. $V = \frac{c_1 v_1 + c_2 v_2}{c_1 + c_2}$

$V = \frac{(3000 + 1000)10^{-6}}{50 \times 10^{-6}} = 80V$

111. $i = \frac{ev}{2\pi r}$

112. $w = \frac{Bq}{M}$

$\frac{2\pi}{T} = \frac{Bq}{M}$

$\therefore T = \frac{2\pi M}{Bq}$

113. $F_e + F_m = 0$

$F_e = -F_m$

$= -q\left(\vec{V} \times \vec{B}\right)$

$= -V_0 B_0\left[(3i - j + 2k) \times (i + 2j - 4k)\right]$

$= -V_0 B_0\left[14j + 7k\right]$

114. $t\alpha \frac{1}{R}$

115. $Tan\phi = \frac{X_L - X_C}{R} = -1$

As current leads voltage by 45^0

$\Rightarrow \frac{1}{WC} - WL = R$

$\frac{1}{WC} = WL + R \Rightarrow C = \frac{1}{W(WL + R)}$

$\therefore c = \frac{1}{2\pi f\left(2\pi fL + R\right)}$

116. $i_d = \frac{A \in_0}{d} . \frac{dv}{dt}$

117. $x = ct$ and $c = \frac{c_0}{\mu}$

118. $\frac{1}{f} = (\mu - 1)\frac{2}{R}$ ……..(1)

$\frac{1}{f^1} = (\mu - 1)\frac{1}{R}$ ……(2)

From (1) and (2)

$\therefore f^1 = 2f$

119. $\frac{I_1}{I_2} = \frac{n}{1}$

$\frac{I_{\max}}{I_{\min}} = \left(\frac{\sqrt{I_1} + \sqrt{I_2}}{\sqrt{I_1} - \sqrt{I_2}}\right)^2$

120. $\frac{N}{N_0} = \frac{1}{2^{\frac{t}{T}}} = \frac{1}{16} gr$

CHEMISTRY

121. $v = 10ms^{-1}$, error=0.1%

$\Delta v = \frac{10 \times 0.1}{100} = 0.01$

$\Delta x \times \Delta p = \frac{h}{4\pi}$

$\Delta x \times \Delta p = \frac{h}{4\pi}$

$\Delta x = \frac{h}{4\pi m \times \Delta v}$

$\Delta x = \frac{6.625 \times 10^{-34}}{4 \times 3.14 \times 0.2 \times 0.01}$

$= 2.64 \times 10^{-32} m$

123. Percentage of ionic nature $= \frac{\mu_{obs}}{\mu_{cal}} \times 100$

125. $n_1 T_1 = n_2 T_2$

129. Large cation statbilize super oxide ions more efficiently

130. As ionic size increases hydration energy decreases.

132. $P^{OH} = P^{kb} + \log \frac{N_s . V_s}{N_b V_b}$

$= 4.8 + \log \frac{25 \times 2}{50 \times 0.1}$

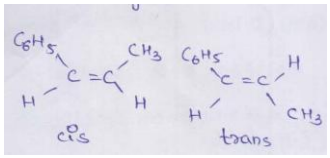
$= 4.8 + \log 10 = 5.8$

$\therefore PH = 14 - 5.8 = 8.2$

135. Acidity $\propto \frac{1}{E.N}$

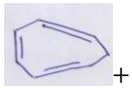
136. $N\% = \frac{1.4 \times N \times V}{wt\ of\ oc}$

137.



138. 2-Pentene

139.



+ It is planar , sp^2 hybridized obeys huckel's rule

140. Lower the TLV ; more is the toxicity

141. $\pi = CRT$

$\pi = \left(\frac{5}{342} \times \frac{1000}{100} \right) 0.0821 \times 423$

$\pi = 5.07\ atm$

142. $4r = \sqrt{2}a$

$r = \frac{1.414 \times 361}{4} \Rightarrow 127\ pm$

143. $E_{cell} = -0.059 \times P^H$

$= -0.059 \times 10$

$= -0.59v$

144. $K = \frac{2.303}{t} \log \frac{a}{a-x}$

$\log \frac{a}{a-x} = \frac{Kt}{2.303}$

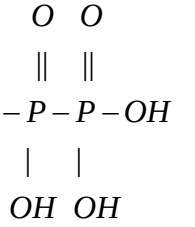
$\log \frac{a-x}{a} = \frac{-Kt}{2.303}$

Apply $y = mx + c$

Slope $= \frac{-k}{2.303}$

145. Greater the charge of the ion, greater is the coagulating ability of the ion

146.



147. Inter halogen compounds are more reactive than halogens

148. Froth flotation process is suitable for sulphide ores

149. F is weak field ligand

$Hyd : SP^3 d^2$

150. SN^2 Order: Methyl > Ethyl > Isopropyl > Tertiary Butyl > Allyl> Benzyl

151. Electron withdrawing groups increase acidic nature of phenols whereas $\bar{e}$ releasing groups decreases acidic nature.

152. Compounds without α -hydrogen atom undergoes cannizaro's reaction

153.

$$C_6H_5NH_2 \xrightarrow[HCl]{NaNO_2} C_6H_5N_2^+Cl^- \xrightarrow[HCl]{CuCl} C_6H_5Cl$$

$$CH_3Cl / Na \text{ dry ether } C_6H_5CH_3$$

154. 2- chloro -1, 3- butadiene

155. Cytosine, thymine, adenine and guanine bases are present in DNA

156. Alitame is about 2000times sweeter than that cane sugar

157. Sucrose, Polysaccharides are non reducing sugars.

158. Expected trend in $Mn > Cr > V > Ti$

But Cr is exceptional due to stable $3d^5$ configuration

$\therefore Cr > Mn > V > Ti$

159. Carboxylic acids with at least one α - hydrogen atom under goes HVZ reaction

160. Acidic strength α molecular mass

(OR)

Acidic strength $\alpha \frac{1}{P^{ka}}$

* * *