SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

SR OUTGOING (EAMCET) | **EAMCET (ENGG) TOT G.T -17** | **Date: 18-08-2020**

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

KEY SHEET

MATHS – A

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

MATHS – B

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

PHYSICS

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

CHEMISTRY

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

HINTS & SOLUTIONS

MATHS-A

1. $5\sin x+4\cos x=3$ ----(1)
   Let $4\sin x-5\cos x=k$ ----(2)
   Squaring and adding
   $25+16=9+k^2$
   $k=4\sqrt{2}$
2. $|\cos 100^\circ|\sec 100^\circ=-1$
3. $\tan(A+B)=\dfrac{\tan A+\tan B}{1-\tan A\tan B}$
   $A+B=\dfrac{\pi}{4}$
4. $\tan\theta+\tan(60^\circ+\theta)+\tan(120^\circ+\theta)=3\tan 3\theta$
   $\tan 3\theta=1$
5. L.C.M of $6\pi,4\pi$ is 12π
6. $t_n=S_n-S_{n-1}$
7. $\left(\overline{A}\right)^T=A$
   $\therefore$ A is Hermitian
8. $(i+i)(1-i-2i)-(1-i)(-2i-1-i)+1(2-1)=9$ is an integer
9. By verification $AA^{-1}=I$
10. $f\left(x+\dfrac{1}{x}\right)=\left(x+\dfrac{1}{x}\right)^2-2$
    $\Rightarrow f(x)=x^2-2$
11. $4^x-2^{x+1}+5=\left(2^x\right)^2-2.2^x+1+4$
    $=\left(2^x-1\right)^2+4\geq 4$
12. $f(x)=5x-3, g(x)=x^2+3$
    $f^{-1}(x)=\dfrac{x+3}{5}$
    $\left(gof^{-1}\right)(3)=g\left(\dfrac{6}{5}\right)=\dfrac{36}{25}+3=\dfrac{111}{25}$
13. $2\sec 2\theta=4$
    $\cos 2\theta=\dfrac{1}{2}\Rightarrow 2\theta=2n\pi\pm\dfrac{\pi}{3}$
14. Let $\cos^{-1}x=\tan^{-1}x=\theta$
    $\Rightarrow\cos\theta=\tan\theta=x$
    $\Rightarrow\cos^2\theta=\sin\theta=x\cos\theta$
    $\sin\left(\cos^{-1}x\right)=\sin\theta=x^2$
15. Put $x=\sinh\theta$
16. Length of the altitude from A to BC = $\dfrac{2r_2r_3}{r_2+r_3}$
17. If $xr_1=yr_2=zr_3$
    Then $a:b:c=y+z:z+x:x+y$
    $a:b:c=5:4:3$
    $a+b+c=12=3(b)$
18. Take 'A' as origin
    $\overline{AG}=\dfrac{1}{3}\left(\bar{b}+\bar{c}\right)$
19. $\overline{n_1}=2\bar{i}-3\bar{j}+4\bar{k}$
    $\overline{n_2}=3\bar{i}-2\bar{j}-3\bar{k}$
    $\cos\theta=\dfrac{\overline{n_1}.\overline{n_2}}{\left|\overline{n_1}\right|.\left|\overline{n_2}\right|}=0$
20. $\dfrac{\bar{a}\times\bar{b}}{\left|\bar{a}\times\bar{b}\right|}$
21. $f(2-x)=0$
22. Let $3^x=t$
    $\therefore 3^x+3^{1-x}-4<0\Rightarrow t^2-4t+3<0$
    $\Rightarrow(t-1)(t-3)<0\ \therefore 1<t<3\Rightarrow 1<3^x<3$
    $\Rightarrow x\in(0,1)$
23. Let the roots are $\dfrac{a}{r},a,ar$
    $S_3=a^3=27\Rightarrow a=3$
    3 is the root of $x^3-13x^2+kx-27=0$
24. $f'(x)=5x^4+9x^2+4>0$ for all $x\in R$
    $f(x)=0$ has only one real root
25. $1=A\left(x^2+1\right)+(Bx+C)x$
26. ${}^6P_4-{}^5P_3$ (deleting numbers starting with 0)
27. $\dfrac{n(n-3)}{2}=35$
28. Quadratic expression is of the form ax^2+bx+c where $a\neq 0$
    a can be choosen in 3ways
    b, c each can be choosen in 4 ways
    required number of quadratic expressions = $3\times4\times4=48$
29. $\dfrac{p}{q}=\dfrac{{}^{2n}C_n}{{}^{(2n-1)}C_n}$
30. Coefficients of x^{r-1},x^r,x^{r+1} of $(1+x)^n$ are in A.P
    $\Rightarrow(n-2r)^2=n+2$
    Put r=10
    $\Rightarrow(n-20)^2=n+2\Rightarrow n^2-41n+398=0$
    $\Rightarrow n^2-41n=-398$

31. Using $r=\frac{np-s}{p+q}=3$

$T_{3+1}=5c_3\left(x^2\right)^2\left(\frac{k}{x}\right)^3$

$10k^3=270$

$k^3=27$

$k=3$

32. Let $x=\frac{1}{1+\cos 2\theta+i\sin 2\theta}$

$=\frac{1}{2\cos\theta[\cos\theta+i\sin\theta]}=\frac{\cos\theta-i\sin\theta}{2\cos\theta}=\frac{1}{2}-\frac{1}{2}i\tan\theta$

33. $x+iy=(5+3i)^3=-10+198i$

$x=-10, y=198$

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

34. Since $z+\frac{1}{z}=-1\Rightarrow z^2+z+1=0$

$\therefore z=\omega$ or ω^2 Let $z=\omega$

Then $z^{50}+\frac{1}{z^{50}}=-1$

35. $xyz=(p+q)\left(p\omega+q\omega^2\right)\left(p\omega^2+q\omega\right)$

$=(p+q)\left(p^2+q^2-pq\right)=p^3+q^3$

36. $\frac{148+146+---}{n}=125$

$\frac{\frac{n}{2}[296+(n-1)(-2)]}{n}=125\Rightarrow n=24$

37. $P\left(\frac{A}{\overline{B}}\right)=\frac{P\left(A\cap\overline{B}\right)}{P\left(\overline{B}\right)}=\frac{P(A\cup B)-P(B)}{1-P(B)}$

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

39. $\sum P(X=x_i)=1$

40. $\lambda=2$

$P(X>1.5)=1-P(X\le 1)$

$=1-P(X=0)-P(X=1)$

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

MATHS - B

41. Longest distance= $d_1=cp+r$

Shortest distance = $d_2=cp-r$

GM of $d_1d_2=\sqrt{d_1d_2}$

42. $2gg^1+2ff^1=c+c^1$

43. Use normal condition $c=-2am-am^3$, where m=slope of the normal

44. $S=(-1,1)$, vertex $(h,k)=(-1,0)$

Use $(x-h)^2=4a(y-k)$

45. $10-a>0$, $4-a>0$

$10>a$ *and* $4>a$

$a<10$ *and* $a<4$

46. $e_1^2+e^2=e^2e_1^2$

$e_1^2-e^2=e^2e_1^2-2e^2$

47. $\int e^x\left(\frac{\left(x^2-x+1\right)\left(x^2+x+1\right)}{x^2+x+1}\right)dx$

$\int e^x\left(x^2-x+1\right)dx$ and apply integrating by parts

48. $I_n=\int\frac{\sin nx}{\cos x}dx, I_{n-2}=\int\frac{\sin(n-2)x}{\cos x}dx$

$I_n+I_{n-2}=\int\frac{\sin nx+\sin(n-2)x}{\cos x}dx$

49. Put $t=\log\left(\frac{g(x)}{f(x)}\right)$

50. $I=16\int_0^{\frac{\pi}{2}}\frac{\left(\frac{\pi}{2}-x\right)\sin\left(\frac{\pi}{2}-x\right)\cos\left(\frac{\pi}{2}-x\right)}{\sin^4\left(\frac{\pi}{2}-x\right)+\cos^2\left(\frac{\pi}{2}-x\right)}dx$ -

--(1)

$I=16\int_0^{\frac{\pi}{2}}\frac{\left(\frac{\pi}{2}-x\right)\cos x\sin x}{\sin^4 x+\cos^4 x}dx$ ------(2)

(1)+(2)= $2I=8\pi\int_0^{\frac{\pi}{2}}\frac{\frac{\sin x\cos x}{\cos^4 x}}{\frac{\sin^4 x}{\cos^4 x}+\frac{\cos^4 x}{\cos^4 x}}dx$

$=\frac{4\pi}{2}\int_0^{\frac{\pi}{2}}\frac{2\tan x\sec^2 x}{\tan^4 x+1}dx$

$=2\pi\int_0^{\infty}\frac{1}{1+t^2}dt=2\pi\left(\frac{\pi}{2}-0\right)=\pi^2$

51. Required area = $\int_0^1\sqrt{1-x^2}-(1-x)dx$

52. $\frac{dy}{dx}+\frac{1}{\cos^2 x}y=\frac{\tan x}{\cos^2 x}$

$\frac{dy}{dx}+\sec^2 xy=\tan x\sec^2 x$

Find integrating factor = $e^{\int\sec^2 xdx}=e^{\tan x}$

General solution

$ye^{\tan x}=\int e^{\tan x}.\tan x\sec^2 xdx$

Put t=tanx

$=\int t e^t dt$

Applying integrating by parts

53. Order= 2, degree = 3
m=2, n=3
m<n

54. Foot of ⊥r of (1,2) to the polar of (1,2) with the circle

55. Given equation of circle write in the form

$(x-x_1)^2+(y-y_1)^2=a^2$,

$(x-x_1)^2+(y-y_1)^2=b^2$

Required equation of circle

$(x-x_1)^2+(y-y_1)^2=a^2+b^2$

56. Let $P(x,y)$ be locus

$(x,y)=\left(\frac{p+a\cos\theta+b\sin\theta}{3},\frac{q+a\sin\theta-b\cos\theta}{3}\right)$

$3x-p=a\cos\theta+b\sin\theta,$

$3y-q=a\cos\theta-b\sin\theta$

Squaring on both sides

$(3x-p)^2+(3y-q)^2=a^2+b^2$

57.

	X	Y
x	cosθ	-sinθ
y	sinθ	cosθ

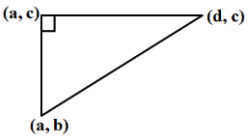
θ=90°

	X	Y
x	0	-1
y	1	0

Sub $x=-Y, y=X \Rightarrow X^2=4ay, Y^2=4ax$

58. $\frac{q^3-r^3}{q-r}=\frac{r^3-p^3}{r-p}=\frac{p^3-q^3}{p-q}$

59. $G=\left(\frac{2a+d}{3},\frac{2c+d}{3}\right)$



$O=(a,c)$

Where G=centroid, O=orthocentre

Midpoint=$\left(\frac{5a+d}{6},\frac{5c+b}{6}\right)$

60. Use image theorem

$\frac{h-x_1}{a}=\frac{k-y_1}{b}=\frac{-2(ax_1+by_1+c)}{a^2+b^2}$

61. Midpoint of the 3rd side = $\frac{3}{2}G$

Verify the options

62. Use $2\sqrt{\frac{g^2-ac}{a(a+b)}}$ (or) $2\sqrt{\frac{f^2-bc}{b(a+b)}}$

$2\sqrt{\frac{36-9c}{9(9+16)}}=\frac{8}{5}\Rightarrow\frac{\sqrt{36-9c}}{5\times3}=\frac{4}{5}$

To get c

63. $P(x,y,z)\Rightarrow PA^2+PB^2=AB^2$

64. $2l+m+2n=0$

Comparing with $al+mb+cn=0$

a=2, b=1, c=2

$3l^2+5m^2-11n^2\Rightarrow ul^2+vm^2+wn^2=0$

$u=3,v=5,w=11$

$a^2(v+w)+b^2(u+w)+c^2(u+v)=0$

The lines are ⊥r to each other

65. $\frac{h-x_1}{a}=\frac{k-y_1}{b}=\frac{l-z_1}{c}=\frac{-(ax_1+by_1+cz_1+d)}{a^2+b^2+c^2}$

66. $\lim_{x\to0}\frac{\frac{\sqrt{1+x^2}}{x}-\frac{\sqrt{1-x+x^2}}{x}}{\left(\frac{3^x-1}{x}\right)}$

$=\frac{1}{\log 3}\lim_{x\to0}\frac{\sqrt{1+x^2}-\sqrt{1-x+x^2}}{x}$

Use L-Hospital rule

67. $\lim_{x\to0}\frac{\sin^4 x\left(\frac{1}{\cos^4 x}-1\right)}{x^6}$

$\lim_{x\to0}\frac{1-\cos x}{x^2}.\frac{1+\cos x}{\cos^4 x}.(1+\cos^2 x)$

68. $\lim_{x\to\frac{\pi}{2}}\frac{k\cos x}{\pi-2x}=f\left(\frac{\pi}{2}\right)$

By L-Hospital rule

$\lim_{x\to\frac{\pi}{2}}\frac{-k\sin x}{-2}=3$

$k=6$

69. Differentiate two times

70. Expand determinant and then differentiate

71. $\delta r=-0.2, V=\frac{4}{3}\pi r^3, \delta v=4\pi r^2\delta r$

72. $m_1=\frac{x^2-y^2}{2xy}$, $m_2=\frac{-2xy}{x^2-y^2}$

$m_1m_2=-1$

Angle = $\frac{\pi}{2}$

73. $V=\pi r^2h \Rightarrow \frac{dh}{dt}=$

74. $f(x)=2x^2-kx+5,\ f'(x)>0$

75. $Max\{f(-4),f(-1),f(3)\}$

76. $f(x)=x^3+bx^2+ax$

$f(1)=1+b+a,\ f(3)=27+ab+3a$

$f(1)-f(3)=0 \Rightarrow -8b-2a-26=0$

$a+4b+13=0;\ f'(x)=3x^2+2bx+a$

$3\left(2+\frac{1}{\sqrt{3}}\right)^2+2b\left(2+\frac{1}{\sqrt{3}}\right)+a=0$

To get b= -6, a= 11

77. $\frac{dx}{dt}=a(-\sin t+t\cos t+\sin t)=at\cos t$

$\frac{dy}{dt}=a(\cos t+t\sin t-\cos t)=at\sin t$

$\sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2}=\sqrt{a^2t^2}=at$

78. $\lim\limits_{x\to\infty}\sum_{r=1}^{n-1}\frac{1}{\sqrt{n^2-r^2}}$

$\lim\limits_{x\to\infty}\frac{1}{n}\sum_{r=1}^{n-1}\frac{1}{\sqrt{1-\left(\frac{r}{n}\right)^2}}=\int_0^1\frac{1}{\sqrt{1-x^2}}dx$

$=\left(\sin^{-1}x\right)_0^1=\frac{\pi}{2}$

79. The D.E of $y=A_1e^{\alpha_1x}+A_2e^{\alpha_2x}+A_3e^{\alpha_3x}$ is

80. $A(2,3),C(-1,1)$

B divides $\overline{AC}$ in the ratio CA+r:r externally

PHYSICS

81. $F=\frac{1}{4\pi\varepsilon_0}.\frac{q_1q_2}{r^2}$

$\in_0=\frac{(AT)(AT)}{MLT^{-2}.L^2}$

$\in_0=A^2M^{-1}L^{-3}T^4$

82. $a=\frac{F}{m}=\frac{4}{20}=\frac{1}{5}ms^{-2}$

$S_3=\frac{1}{2}a(2n-1)=\frac{1}{2}\times\frac{1}{5}(5)$

$S_3=\frac{1}{2}m$

$\therefore W=F\times S_3=4\times\frac{1}{2}=2J$

83. $V=a+2bt-3ct^2$

$a=2b-6ct$

Since a=0, then $t=\frac{b}{3c}$

$V=a+2b\left(\frac{b}{3c}\right)-3c\left(\frac{b}{3c}\right)^2$

$V=a+\frac{2b^2}{3c}-\frac{3b^2}{9c}$

$V=a+\frac{b^2}{3c}$

84. Maximum height $H=\frac{V^2\cos^2\beta}{2g}$

$V\cos\beta=\sqrt{2gH}$

$t=\frac{V\cos\beta}{g}=\frac{\sqrt{2gH}}{g}=\sqrt{\frac{2H}{g}}$

85. $F_1=3F_2$

$mg(\sin\theta+\mu\cos\theta)=3(\mu mg\cos\theta)$

$\sin\theta=2\mu\cos\theta$

$\tan\theta=2\mu=2\times\frac{1}{2\sqrt{3}}=\tan 30°$

$\theta=30°$

86. Gravitational PE =

$-\frac{Gm_1m_2}{r_{12}}-\frac{Gm_2m_3}{r_{23}}-\frac{Gm_2m_1}{r_{31}}$

$=-G[2]-6G-3G=-11G$

87. $Q=\frac{\pi Pr^4}{8\eta l}$

$Q\alpha\frac{Pr^4}{r}$

$\frac{Q_1}{Q_2}=\frac{P_1}{P_2}\times\left[\frac{r_1}{r_2}\right]\times\frac{l_2}{l_1}$

88. $Y=2\eta(1+\sigma)$

$\frac{Y}{\eta}=2(1+\sigma)$

89. $a_{cm}=\left(\frac{m_1-m_2}{m_1+m_2}\right)^2g$

$a_{cm}=\left(\frac{3m-m}{4m}\right)^2g$

$a_{cm}=\left(\frac{2m}{4m}\right)^2g$

$a_{cm}=\frac{g}{4}$

90. $W=mgR^2\left[\frac{1}{R}-\frac{1}{3R}\right]$

$W = \frac{2}{3}mgR$

91. $\frac{4}{3}\pi R^3 = 2\times\frac{4}{3}\pi r^3$

$R = 2^{1/3}.r$

$E = 4\pi R^2 T = 4\pi\times 2^{2/3}.r^2 T$

$E = 2^{8/3}\pi r^2 T$

92. Work done = $\frac{GMm}{R}$

$= \frac{6.67\times10^{-11}\times100\times10\times10^{-3}}{10\times10^{-2}} = 6.67\times10^{-10}\,J$

93. Angular momentum = L =

$m\left[u\sin\theta\right]\left[\frac{u^2\sin^2\theta}{2g}\right]$

94. $\frac{V_1}{V_2} = \left[\frac{\Delta P_2}{\Delta P_1}\right]^3 = \left[\frac{1.02-1}{1.01-1}\right]^3$

95. $\frac{dQ}{dT}\alpha\left(T^4 - T_0^4\right)$

96. $T\,\alpha\,P$

97. $T\,\alpha\,C^a\,\alpha\,G^b\,\alpha\,h^c$

98. $\Delta n = n_1 - n_2$

$\frac{10}{3} = V\left[\frac{1}{1} - \frac{1}{1.01}\right]$

$\frac{10}{3} = V\frac{0.01}{1.01}$

$V = \frac{1010}{3}$

$V = 336.6 ms^{-1}$

99. At y=0, KE= $\frac{1}{2}m\omega^2A^2$

At y=A/2, PE= $\frac{1}{2}m\omega^2\frac{A^2}{4}$

$\frac{KE}{PE} = \frac{4}{1} = 4:1$

100. $E = \frac{\frac{1}{2}mV_{rms}^2}{V}$

$E = \frac{1}{2}.\left(\frac{m}{V}\right)V_{rms}^2$

$E = \frac{1}{2}.PV_{rms}^2$

$E = \frac{3P}{2} \Rightarrow P = \frac{2E}{3}$

101. $\frac{B_a}{B_c} = \frac{R^3}{\left(R^2+x^2\right)^{3/2}}$

$B_a = \frac{B.R^3}{\left(2R^2\right)^{3/2}}$

$B_a = \frac{B}{2\sqrt{2}} = \frac{B}{\sqrt{8}}$

102. $S = \frac{Gi_g}{i-i_g} = \frac{10^{-3}\times25}{2-10^{-3}}$

$S = 0.0125\Omega$

103. $I = \frac{2E}{R+r_1+r_2}$

$V = E - Ir_1 = 0$

$I = E/r_1$

$\frac{2E}{R+r_1+r_2} = \frac{E}{r_1}$

$2r_1 = R + r_1 + r_2$

$R = r_1 - r_2$

104. $\Delta V = \frac{1}{2}\frac{C_1C_2}{\left(C_1+C_2\right)}\left(V_1^2\right)$

$\Delta V = \frac{1}{2}\frac{400\times10^{-12}}{2}\times10^4 = 10^{-6}\,J$

105. $KE = \frac{1}{2}mv^2 = \frac{1}{2}m\left(\frac{Eqt}{m}\right)^2$, $KE = \frac{E^2q^2t^2}{2m}$

106. $B = \sqrt{B_H^2 + B_V^2} = \sqrt{\left(4\times10^{-5}\right)^2 + \left(3\times10^{-5}\right)^2}$

$= \sqrt{(16+9)10^{-10}} = 5\times10^{-5} = 0.5\times10^{-4}T$

107. $V = i\left[\frac{Rr}{R+r}\right]$

$50R = 2500 + R$

$49R = 2500$

$R = 51\Omega$

108. $X = \frac{d}{\frac{i_2}{i_1}+1} = \frac{5}{\frac{6}{2}+1}$

= 1.25 cm from B

109. $B = B_1 + B_2$

110. Transformer does not work for DC input

111. $\cos\phi = \frac{R}{Z}$ and $\tan\phi = \frac{wL}{R}$

112. $U = \frac{1}{2}Li^2$

$\frac{du}{dt} = Li\left(\frac{di}{dt}\right)$

113. Momentum = $p = \frac{2U}{C}$ and force $= \frac{p}{t}$

114. $\frac{1}{f^2}\alpha R^3$

115. $A=\lambda N\ 3\times10^{-6}\times3.7\times10^{10}=0.005\times N$

$N=2.22\times10^{7}$

116. Conceptual

117. For an insulator $E_g>3eV$

118. $Y=\overline{\overline{A}.\overline{B}}=\overline{\overline{A+B}}=A+B$

119. $E=\dfrac{Nx}{A}$

$E=\dfrac{200\times10^{6}\times1.6\times10^{-19}\times6.023\times10^{26}}{235}$

$E=8.2\times10^{13}J$

120. $\dfrac{1}{\lambda_{max}}=R\left[\dfrac{1}{2^2}-\dfrac{1}{3^2}\right]=\dfrac{5R}{36}$

$\dfrac{1}{\lambda_{min}}=R\left[\dfrac{1}{2^2}-\dfrac{1}{\alpha}\right]=\dfrac{R}{4}$

$\dfrac{\lambda_{min}}{\lambda_{max}}=\dfrac{4}{R}\times\dfrac{5R}{36}=\dfrac{5}{9}$

CHEMISTRY

121. For p fund series, $n_1=5$

$\bar{v}=\dfrac{1}{\lambda}=R\left[\dfrac{1}{5^2}-\dfrac{1}{6^2}\right]$

122. $\dfrac{I+E}{544}$

123. 2 : 3

124. $\dfrac{r_1}{r_2}=\sqrt{\dfrac{M_2}{M_1}}$

125. Caro's acid - H_2SO_5

$x+2+3(-2)+2(-1)=0$

$x=6$

126. $C_6H_3(OH)_3$

127. $NaCl_{(aq)}, NH_3, CaCO_3$

128. $K=\dfrac{[NOCl]^2}{[NO]^2[Cl_2]}$

129. $CaF_2\rightarrow Ca^{+2}+2F^-$

S 2S

$K_{SP}=\left[Ca^{+2}\right]\left[F\right]^{-2}$

S $(2S)^2$

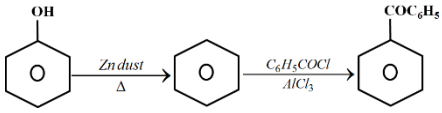
$K_{SP}=4S^3$

$K_{SP}=4\left(2\times10^{-2}\right)^3$

$=4\left(8\times10^{-6}\right)$

130. less than 0

132. $CH_2=CH_2\xrightarrow[CCl_4]{Br_2}\underset{\quad|\quad\ |}{CH_2-CH_2}\xrightarrow{Alc.HKOH}C_2H_2$ (Br Br)

133. 

135. $m=\dfrac{wt}{mwt}\times\dfrac{1000}{wt\ of\ solvent}$

136. 0.225 – 0.414

137. Degree of ionization $\alpha=\dfrac{20}{200}=0.1$

% of ionization = 0.1 × 100 = 10%

138. Sum of the powers

141. $HClO$

$1+x-2=0$

$x=1$

143. coordination number = 6. (octahedral)

144. $C_6H_5CH_3\xrightarrow{KMnO_4}C_6H_5COOH\xrightarrow{SOCl_2}$

$C_6H_5COCl\xrightarrow{H_2/Pd}C_6H_5CHO$

$C_2H_4+H_2SO_4\xrightarrow{80^\circ C}$

145. $C_2H_5OSO_3H,\xrightarrow{H_2O/\Delta}C_2H_5OH$

146. $CH_3CHO\xrightarrow{H_2N-NH_2}CH_3-CH$

$=NNH\xrightarrow[Ethylene\ glycol]{KOH}CH_3CH_3+N_2$

147. $3CH_3OH+PCl_3\longrightarrow3CH_3Cl+H_3PO_3$

$CH_3Cl\xrightarrow{KCN}CH_3CN$

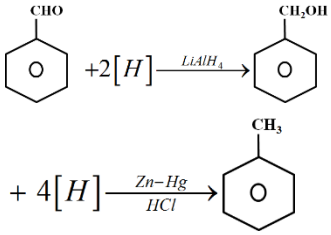
$CH_3CN\xrightarrow{H_2O}CH_3COOH$

148. $C_6H_5NH_2\xrightarrow[HCl,5^\circ C]{NaNO_2}C_6H_5N_2Cl\xrightarrow{CuCl/HCl}$

$C_6H_5Cl\xrightarrow[dry\ ether]{CH_3Cl/Na}C_6H_5CH_3$

150. Due to lack of hemi acetal

155. $A=C_2H_5I, B=C_2H_5OH, C=C_2H_5OC_2H_5$

156. 

157. $CH_3Cl\xrightarrow{KCN}CH_3CN\xrightarrow{Hyd}CH_3COOH$

$2CH_3COOH\xrightarrow{P_4O_{10}}(CH_3COO)_2O+H_2O$

158. $C_6H_5N_2Cl\xrightarrow{H_2O}C_6H_5OH$

159. $5\times2^4=80$

160. In BCC unit cell

Packing fraction = 68 %

Void space = 32 %

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