Sri Chaitanya IIT Academy.,India.

A.P T.S KARNATAKA TAMILNADU MAHARASTRA DELHI RANCHI

A right Choice for the Real Aspirant

ICON Central Office - Madhapur - Hyderabad

SEC: Sr.S60_Elite, Target & LIIT-BTs	JEE-MAIN	Date: 08-01-2025
Time: 09.00Am to 12.00Pm	GTM-15/10	Max. Marks: 300

KEY SHEET

MATHEMATICS

1)	2	2)	1	3)	1	4)	1	5)	1
6)	1	7)	1	8)	2	9)	3	10)	2
11)	1	12)	3	13)	4	14)	2	15)	2
16)	3	17)	4	18)	4	19)	4	20)	1
21)	3	22)	5	23)	81	24)	12	25)	193

PHYSICS

26)	1	27)	4	28)	2	29)	2	30)	2
31)	2	32)	3	33)	4	34)	1	35)	3
36)	3	37)	2	38)	1	39)	1	40)	2
41)	1	42)	3	43)	4	44)	1	45)	4
46)	3	47)	20	48)	3	49)	2	50)	9

CHEMISTRY

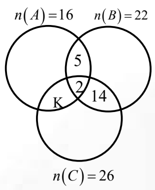
51)	1	52)	3	53)	2	54)	3	55)	3
56)	2	57)	4	58)	1	59)	1	60)	1
61)	4	62)	4	63)	1	64)	2	65)	1
66)	1	67)	3	68)	1	69)	3	70)	3
71)	0	72)	6	73)	2	74)	4	75)	7

SOLUTIONS

MATHEMATICS

1. $n(A\cup B\cup C)=16+22+6-5-14-K+2 \quad \Rightarrow \quad 40=47-K \Rightarrow K=7$

$\Rightarrow$ Number of students who study English and Mathematics but not economics=5



2. $f(x)=\frac{\sin x}{\sqrt{1-\cos^2 x}}+\frac{\cos x}{\sqrt{1-\sin^2 x}}+\frac{\tan x}{\sqrt{\sec^2 x-1}}+\frac{\cot x}{\sqrt{\cos ec^2 x-1}}$

$$=\frac{\sin x}{|\sin x|}+\frac{\cos x}{|\cos x|}+\frac{\tan x}{|\tan x|}+\frac{\cot x}{|\cot x|}=\begin{cases}4, & x\in 1^{st}\ quadrant\\ -2, & x\in 2^{nd}\ quadrant\\ 0, & x\in 3^{rd}\ quadrant\\ -2, & x\in 4^{th}\ quadrant\end{cases} \qquad f(x)_{\max}=4$$

3. $\log_{\sqrt{2}}\left(\frac{|z|+11}{|z|^2-2|z|+1}\right)\ge 0 \Rightarrow \frac{|z|+11}{|z|^2-2|z|+1}\ge 1$

$\Rightarrow |z|^2-2|z|+1\le |z|+11$

$\Rightarrow (|z|-5)(|z|+2)\le 0 \Rightarrow |z|\le 5\left[\because |z|+2>0\right]$

4. Let root of $x^2-6x+a=0$ are $\alpha, 4\beta = 4\alpha\beta=a$

$x^2-cx+6=0$ are $\alpha, 3\beta=3\alpha, \beta=6 \Rightarrow a=8$

$\Rightarrow \quad x^2-6x+8=0 \Rightarrow x^2-cx+6=0$

Has a root common $\Rightarrow c=5\ or\ c=\frac{11}{2}$

Integral roots are 2, 4 and 2, 3. Common root is 2

5. ΔABC is a right angled triangle at B and midpoint of hypotenuse AC is the circumcentre

Circumcentre of ΔABC is $S(0,0)$

6. Now

$$\lim_{x\to\infty}\frac{a\left(1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+.......\right)+\beta\left(1-x+\frac{x^2}{2!}-\frac{x^3}{3!}+......\right)+\gamma\left(x-\frac{x^3}{3!}+.......\right)\left[\because \sin x\le x \forall x\in R\right]}{x^3}$$

Constant terms should be zero $\Rightarrow \quad \alpha+\beta=0$

Coefficient of x should be zero $\Rightarrow \alpha-\beta+\gamma=0$

Coefficient of x^2 should be zero $\lim_{x\to 0}\frac{x^3\left(\frac{\alpha}{3!}-\frac{\beta}{3!}-\frac{\gamma}{3!}\right)+x^4\left(\frac{\alpha}{3!}-\frac{\beta}{3!}-\frac{\gamma}{3!}\right)}{x^3}=\frac{2}{3}$

$\Rightarrow \ \frac{\alpha}{2}+\frac{\beta}{2}=0$, Now $\Rightarrow \ \frac{\alpha}{6}-\frac{\beta}{6}-\frac{\gamma}{6}=2/3 \quad \Rightarrow \quad \alpha=1,\beta=-1,\gamma=-2$

7. We arrange the letters of OUGHT in alphabetical order as G, H, O, T, U
In dictionary words starting with

$G \dashrightarrow 4!$
$H \dashrightarrow 4!$
$O \dashrightarrow 4!$
$TG \dashrightarrow 3!$
$TH \dashrightarrow 3!$
$TOG \dashrightarrow 2!$
$TOH \dashrightarrow 2!$
$TOUGH \rightarrow 1!$

Total = 89

8. $\frac{dy}{dx}=\frac{2^{x+y}-2^x}{2^y}\Rightarrow\frac{dy}{dx}=2^x\frac{\left(2^y-1\right)}{2^y}\Rightarrow\frac{2^y}{2^y-1}dy=2^x dx\Rightarrow\int\frac{2^y}{2^y-1}dy=\int 2^x dx$

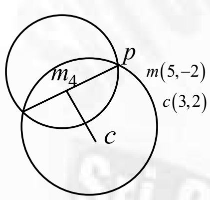
$\Rightarrow \ \frac{\log\left(2^y-1\right)}{\log 2}=\frac{2^x}{\log 2}+c;\ y(0)=1\Rightarrow\ 0=\frac{1}{\log 2}+c\Rightarrow c=\frac{-1}{\log 2}$

$\therefore \ \frac{\log\left(2^y-1\right)}{\log 2}=\frac{2^x}{\log 2}-\frac{1}{\log 2}\Rightarrow\log\left(2^y-1\right)=2^x-1$

If $x=1$ than $\log\left(2^y-1\right)=2-1=1\Rightarrow 2^y-1=e\Rightarrow 2^y=e+1\Rightarrow y=\log_2(e+1)$

$\Rightarrow \ y(1)=\log_2(e+1)$

9.



$2x+3y=12,\ 3x-2y=5, \quad 13x=39 \quad\Rightarrow\quad x=3,y=2$

Centre $=C=(5,-2)$, radius $=r=\sqrt{25+4-13}=\sqrt{16}=4$, $CM=\sqrt{20}$, $CP=6$.

10. As standard deviation is independent of change of origin
$\therefore$ It remains same $\therefore\ S.D=2\lambda$

11. Given the lines $\frac{x-1}{2}=\frac{2-y}{-3}=\frac{z-3}{\alpha}$ and $\frac{x-4}{5}=\frac{y-1}{2}=\frac{z}{\beta}$ intersect

So, point on first line $(1,2,3)$ and point on second line $(4,1,0)$

Vector joining both points is $-3\hat{i}+\hat{j}+3\hat{k}$

Now vector along first line is $2\hat{i}+3\hat{j}+\alpha\hat{k}$

Also vector along second line is $5\hat{i}+2\hat{j}+\beta\hat{k}$

Now these three vectors must be coplanar $\Rightarrow \begin{vmatrix} 2 & 3 & \alpha \\ 5 & 2 & \beta \\ -3 & 1 & 3 \end{vmatrix} = 0$

$\Rightarrow \quad 2(6-\beta)-3(15+3\beta)+\alpha(11)=0 \quad \Rightarrow \alpha-\beta=3$

12. Given $\dfrac{\frac{n}{2}\left[2a_1+(n-1)d_1\right]}{\frac{n}{2}\left[2a_2+(n-1)d_2\right]}=\dfrac{5n+3}{3n+4}$

For $n=7, \dfrac{a_1+3d_1}{a_2+3d_2}=\dfrac{38}{25}$

13. Equation of directrix is $x=0$...........(1)

Equation of the tangent at vertex is $x=4$...........(2)

(2) is equidistant from (1) and latus rectum

$\therefore$ equation of latusrectum is $x=8$

14. By given condition, $a_2-a_1=a_3-a_2=.......=a_{2025}-a_{2024}=1$

$\therefore \tan^{-1}\left(\dfrac{a_2-a_1}{1+a_1a_2}\right)+\tan^{-1}\left(\dfrac{a_3-a_2}{1+a_2a_3}\right)+.....+\tan^{-1}\left(\dfrac{a_{2025}-a_{2024}}{1+a_{2024}a_{2025}}\right)$

$\left[\tan^{-1}a_2-\tan^{-1}a_1\right]+\left[\tan^{-1}a_3-\tan^{-1}a_2\right]+.......+\left[\tan^{-1}a_{2025}-\tan^{-1}a_{2024}\right]$

$=\tan^{-1}a_{2025}-\tan^{-1}a_1=\tan^{-1}(2025)-\dfrac{\pi}{4}$

15. $y=\dfrac{2}{\sqrt{a^2-b^2}}Tan^{-1}\left(\sqrt{\dfrac{a-b}{a+b}}Tan\dfrac{x}{2}\right)$

$\dfrac{dy}{dx}=\dfrac{2}{\sqrt{a^2-b^2}}\dfrac{1}{\left(1+\dfrac{a-b}{a+b}Tan^2\dfrac{x}{2}\right)}\sec^2\dfrac{x}{2}.\dfrac{1}{2}\sqrt{\dfrac{a-b}{a+b}}$

$\left.\dfrac{dy}{dx}\right|_{x=\frac{\pi}{2}}=\dfrac{1}{a}$

16. $\mathbf{a}+\mathbf{b},\mathbf{a}-\mathbf{b}$ are mutually perpendicular $\Rightarrow (\mathbf{a}+\mathbf{b}).(\mathbf{a}-\mathbf{b})=0\Rightarrow \mathbf{a}^2-\mathbf{b}^2=0$

$\Rightarrow \left|\hat{i}+\lambda\hat{j}-3\hat{k}\right|^2-\left|3\hat{i}-\hat{j}+2\hat{k}\right|^2=0\Rightarrow 1+\lambda^2+9=9+1+4\Rightarrow \lambda^2=4\Rightarrow \lambda=2\left[\because \lambda>0\right]$

$\cos\theta=\dfrac{\mathbf{a}.\mathbf{b}}{|\mathbf{a}||\mathbf{b}|}=\dfrac{(\hat{i}+2\hat{j}-3\hat{k}).(3\hat{i}-\hat{j}+2\hat{k})}{\left|\hat{i}+2\hat{j}-3\hat{k}\right|\left|3\hat{i}-\hat{j}+2\hat{k}\right|}=\dfrac{3-2-6}{\sqrt{1+4+9}\sqrt{9+1+4}}=\dfrac{-5}{14}$

$\Rightarrow \quad 14\cos\theta=-5\Rightarrow(14\cos\theta)^2=25.$

17. $E_1=\{(4,1),(4,2),(4,3),(4,4),(4,5),(4,6)\}$

$E_2 = \{(1,2),(2,2),(3,2),(4,2),(5,2),(6,2)\}$

$E_3 = \{(1,2),(1,4),(1,6),(2,1),(2,3),(2,5),(3,2),(3,4),(3,6),(4,1),(4,3),(4,5),(5,2),(5,4),(5,6),(6,1),(6,3),(6,5)\}$

$$P(E_1) = \frac{1}{6}; P(E_2) = \frac{1}{6}; P(E_3) = \frac{1}{2}$$

$$P(E_1 \cap E_2) = \frac{1}{36}, P(E_2 \cap E_3) = \frac{1}{12}, P(E_1 \cap E_3) = \frac{1}{12}$$

And $P(E_1 \cap E_2 \cap E_3) = 0 \neq P(E_1).P(E_2).P(E_3)$

$\Rightarrow \quad 0 \neq \frac{1}{6}.\frac{1}{6}.\frac{1}{2} \Rightarrow E_1, E_2, E_3$ are not independent.

18. $\int \frac{2x^{12}+5x^9}{(1+x+x^5)^3}dx = \int \frac{2x^{12}+5x^9}{x^{15}\left(\frac{1}{x^5}+\frac{1}{x^2}+1\right)^3}dx \quad = \int \frac{\frac{2}{x^3}+\frac{5}{x^6}}{\left(\frac{1}{x^5}+\frac{1}{x^2}+1\right)^3}dx$

Put $\frac{1}{x^2}+\frac{1}{x^5}+1 = t \; = \int -\frac{dt}{t^3} = \frac{1}{2t^2}+c \quad = \frac{1}{2\left(\frac{1}{x^5}+\frac{1}{x^2}+1\right)^2}+c \quad = \frac{x^{10}}{2(1+x^3+x^5)^2}+c$

$m = 10; r = 2; l = 2; \; \frac{m+l}{r} = 6$

19. Given $f(x) = x^2+9, g(x) = \frac{x}{x-9} \qquad a = f(g(10)) = f\left(\frac{10}{10-9}\right) = f(10) = 109$

$b = g(f(3)) = g(9+9) = g(18) = \frac{18}{9} = 2$

$E: \frac{x^2}{109}+\frac{y^2}{2} = 1; e^2 = 1-\frac{2}{109} = \frac{107}{109}; \ell = \frac{2(2)}{\sqrt{109}} = \frac{4}{\sqrt{109}}; 8e^2+\ell^2 = \frac{8(107)}{109}+\frac{16}{109} = 8$

20. a. $|A| = 2 \Rightarrow |2A^{-1}| = 2^3/|A| = 4$

b. $|adj(adj(2A))| = |2A|^4 = 2^{12}|A|^4 = 2^{12}/2^{12} = 1$

c. $(A+B)^2 = A^2+B^2 \qquad \Rightarrow \qquad AB+BA = O$

$\Rightarrow \quad |AB| = |-BA| = -|BA| = -|AB| \qquad \Rightarrow \qquad |AB| = 0 \qquad \Rightarrow \qquad |B| = 0$

d. Product ABC is not defined.

21. Tangent to the curve $\frac{x^2}{9}+\frac{y^2}{4} = 1$ is

$y^2 = mx \pm \sqrt{a^2m^2+b^2}, y = mx \pm \sqrt{9m^2+4}$

And equation of tangent to the curve $x^2+y^2 = \frac{31}{4}$ is

$y = mx \pm a\sqrt{1+m^2}, y = mx \pm \sqrt{\frac{31}{4}(1+m^2)}$

For common tangent $9m^2+4=\frac{31}{4}+\frac{31}{4}m^2 \Rightarrow \frac{5}{4}m^2=\frac{15}{4}\Rightarrow m^2=3$

22. Here $\Delta=0$ and $\Delta_1=\Delta_2=\Delta_3=0\Rightarrow k=1,2$ then $A^2+B^2=1+4=5$

23. f is continuous at $x=\frac{\pi}{2}\Rightarrow \lim_{x\to\pi/2-}f(x)=\lim_{x\to\pi/2+}f(x)=f\left(\frac{\pi}{2}\right)$

$$\Rightarrow \lim_{x\to\pi/2-}\left(\frac{8}{7}\right)^{\frac{\tan 8x}{\tan 7x}}=\lim_{x\to\pi/2+}\left(1+|\cot x|\right)^{\frac{b}{a}|\tan x|}=a-8$$

$$\Rightarrow \left(\frac{8}{7}\right)^0=e^{\lim\limits_{x\to\pi/2+}(1+\cot x)-1\frac{b}{a}\tan x}=a-8\Rightarrow 1=e^{\lim\limits_{x\to\pi/2+}\frac{b}{a}}=a-8\Rightarrow a-8=1,e^{b/a}=1$$

$$\Rightarrow a=9,b=0,\quad \therefore\ a^2+b^2=81+0=81$$

24. $\alpha=\lim_{x\to0+}\frac{e^{\sqrt{\tan x}}-e^{\sqrt{x}}}{\sqrt{\tan x}-\sqrt{x}}=1,\beta=\lim_{x\to0}(1+\sin x)^{\frac{1}{2}\cot x}=e^{1/2}$

The equation having roots 1, $\sqrt{e}$ is $x^2-\left(1+\sqrt{e}\right)x+\sqrt{e}=0$

It is given as $ax^2+bx-\sqrt{e}=0$

By comparing we get $\frac{a}{1}=\frac{b}{-\left(1+\sqrt{e}\right)}=\frac{-1}{1}a=-1,b=1+\sqrt{e}$

$\therefore\quad 12\log_e(a+b)=12\log_e\left(-1+1+\sqrt{e}\right)=6$.

25. $P(X=0)+P(X=1)+P(X=2)+P(X=3)+P(X=4)$

$$=\left(\frac{1}{2}\right)^{10}+{}^{10}C_1\left(\frac{1}{2}\right)^9\left(\frac{1}{2}\right)+{}^{10}C_2\left(\frac{1}{2}\right)^8\left(\frac{1}{2}\right)^2+{}^{10}C_3\left(\frac{1}{2}\right)^7\left(\frac{1}{2}\right)^3+{}^{10}C_4\left(\frac{1}{2}\right)^6\left(\frac{1}{2}\right)^4=\frac{193}{2^9}$$

PHYSICS

26. $V=\dfrac{KQ}{R}$

27. $C=C_1+C_2+C_3$

28. Since the balancing length is at the midpoint, each wire has a resistance equal to the known resistance value R. When they are in series, if ℓ is the balancing length measured from the left, we have resistance R in the left gap and 2R in the right gap.

Thus $\dfrac{R}{2R}=\dfrac{\ell}{100-\ell}$

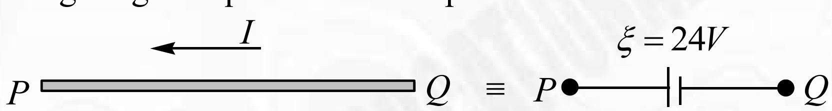
$\Rightarrow \quad \ell=33.3\ cm$

29. $\xi=B\ell\upsilon_{\perp}$

$\Rightarrow \quad \xi=(3)(2)(8\sin 30)$

$\Rightarrow \quad \xi=24\ V$

From Fleming's Right Hand Rule, the induced current in the rod PQ is directed from Q to B, thus giving an equivalent emf replacement of the motional emf as



So, P is at a higher potential.

30. At resonant frequency

$X_L=X_C$

$\therefore \quad Z=R$ (minimum)

31. Work done by friction on inclined plane will be negative

$W=Fs\cos\theta=+ve, if\ \theta<90^0$.

32. $0=\vec{P}_{gun}+\vec{P}_{bullet}$

Or $P_{gun}=P_{bullet}$

$\dfrac{K_{gun}}{K_{bullet}}=\dfrac{P_{gun}^2/2m_{gun}}{P_{bullet}^2/2m_{bullet}}=\dfrac{m_{bullet}}{m_{gun}}$.

33. Total distance moved by the bodies,

$x_1+x_2=12R-3R=9R$ ………….. (i)

Also, $Mx_1=5Mx_2$ ……….. (ii)

After solving above equations, we get

$x_1=7.5R$

$x_2=1.5R$

34. iii. $[H]=\left[\dfrac{Heat}{Mass}\right]=\dfrac{ML^2T^{-2}}{M}=L^2T^{-2}$

iv. $[s]=\left[\dfrac{Heat}{Mass\times Temperature}\right]=\dfrac{ML^2T^{-2}}{MK}=L^2T^{-2}K^{-1}$

35. Resultant force

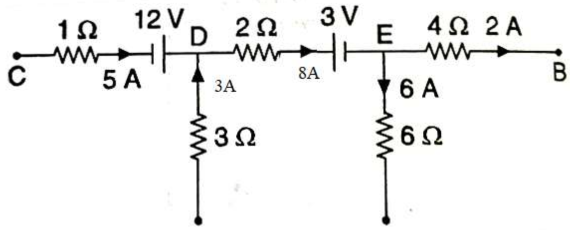
36. $\frac{1}{2}MV_e^2$

37. EXCESS PRESSURE $=\frac{4S}{R}$

38. l decreases as the block moves up.
39. Isothermal process
40. Adiabatic process
41. Heat and work depends on the path taken to reach a specific value. Hence, heat and work are path functions.
42. The formula connecting u, v and f for a spherical mirror $\frac{1}{u}+\frac{1}{v}=\frac{1}{f}$ is valid only for mirrors of small apertures where the size of aperture is very small as compared to the radius of curvature of the mirror. Laws of mirror are valid for plane as well as large spherical surfaces. The laws of reflection are valid when ever the light is reflected.
43. $K.E=\frac{1}{2}k\left(A^2-d^2\right) \text{ and } P.E=\frac{1}{2}kd^2$
At mean position $d=0$. At extreme position $d=A$.
44. Let f_1 be the frequency heard by wall, $f_1=\left(\frac{v}{v-v_c}\right)f_0$
Here, $v=$ Velocity of sound,
$v_c=$ Velocity of Car,
$f_0=$ actual frequency of car horn
Let f_2 be the frequency heard by driver after reflection from wall.
$f_2=\left(\frac{v+v_c}{v}\right)f_1=\left(\frac{v+v_c}{v-v_c}\right)f_0$
$\Rightarrow \quad 480=\left[\frac{345+v_c}{345-v_c}\right]440 \Rightarrow \frac{12}{11}=\frac{345+v_c}{345-v_c}$
$\Rightarrow \; v_c=54\ km/hr$
45. Given : $v_{particle}=4v_{electron}$ and $\lambda_{particle}\times 2\lambda_{electron}$
Using $\lambda=\frac{h}{p}$
$\lambda P=\text{constant}$
$\therefore \quad \lambda_{particle}\times p_{particle}=\lambda_{electron}\times p_{electron}$
$\Rightarrow \quad \lambda_{particle}\times m_{particle}\times v_{particle}$
$=\lambda_{electron}\times m_{electron}\times v_{electron}$
$\therefore \quad m_{particle}v_{particle}=\frac{m_{electron}v_{electron}}{2}$
$\Rightarrow \quad m_{particle}=\frac{m_{electron}}{8}$

46. Both the diodes are reverse biased, so, there is no flow of current through 5Ω and 20Ω resistances. Now, two resistors of 10Ω and two resistors of 5Ω are in series.
Hence, current I through the network $= 0.3A$.

47. Applying Kirchhoff's Junction Law at E current in wire DE is 8 A from D to E. Now further applying Junction Law at D. The current in 3Ω resistance will be 3A towards D.



48. $\vec{B} = \frac{\mu_0 I}{2R}\left(\pm\hat{i}\right) + \frac{\mu_0 I}{2R}\left(\pm\hat{j}\right) + \frac{\mu_0 I}{2R}\left(\pm\hat{k}\right)$

$\Rightarrow \quad \left|\vec{B}\right| = \frac{\mu_0 I}{2R}\sqrt{3}$

49. weight = buoyant force

50. We have given, $\frac{I_1}{I_2} = \frac{1}{4} \Rightarrow I_2 = 4I_1$

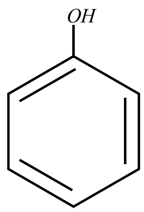
$I_{\max} = \left(\sqrt{I_1} + \sqrt{I_2}\right)^2 = 9I_1$

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

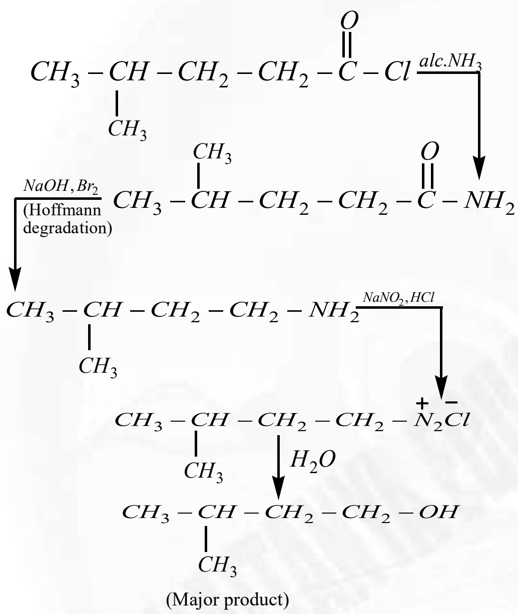
CHEMISTRY

51. Theory based

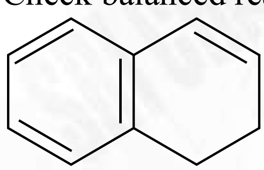
52. 1^0 alkyl halides more reactive towards S_N2 reaction.

53. 

54.



55. Check balanced reaction given

56. 

57. Mass of pure $CaCO_3 = 200 \times \frac{95}{100} = 190kg$

$$CaCO_3 \xrightarrow{\Delta} CaO + CO_2$$

100g	56
$1g$	$\frac{56}{100}$

190 kg $\quad \frac{56}{100} \times 190kg = 106.4\ kg$

58. 2-methyl-5-oxo hexanoic acid

59. If both Assertion and Reason are true Reason is the correct explanation of Assertion

60. Conceptual

61. Kolbe's reaction

62. Depression in freezing point, $\Delta T_f = iK_f m$. The value of van't Hoff factor (i) is minimum for the glucose, which is a non-electrolyte. Hence, aqueous solution of glucose has highest freezing point.

63. $E_{n,z} = -13.6 \times \frac{z^2}{n^2} eV$

64. C=4, Si=6

65. $i)\left[Co(en)_3\right]^{3+}$; O. I (only)

$ii)\left[Co(NH_3)_4 Cl_2\right]^{+}$; G. I (only)

$iii)\left[Cr(gly)_3\right]$; both O. I and G. I

$iv)\left[Co(NH_3)Cl_3\right]$; G. I (fac and mer)

66. $i) Ni^{+2}; d^8; SFL; C.No = 4; square\ planar$

$ii) Ni^{+2}; d^8; WFL; C.No = 4; Tetrahedral$

$iii) Ni^0; 4s^2 3d^8; SFL; C.No = 4; Tetrahedral$

$iv) Co^{+2}; 3d^7; WFL; C.No = 4; Tetrahedral$

67. $FeSO_4(NH_4)_2 SO_4.6H_2O$ (Mohr's salt)

68. $(i) B < Ga < Al < In < Tl : Atomic\ radius$

$(ii) Tl : more\ stable\ in +1$ due to I.P.E

69. $NH_3 > PH_3 > AsH_3 > SbH_3$: Lemis basic structure

70. $i)\ F_2\ to\ I_2$; SRP values decreases

$ii)\ Cl > F > Br > I$; electron affinity

$iii)\ Cl_2 > Br_2 > F_2 > I_2$; BDE

71. 0

72.

$2 \times (+1) + 1 \times x + 4 \times (-2) = 0$

$x = \pm 6$

73. X = 3, Y = 2, Z = 3

74. I, II, III, IV compounds gives iodoform text.

75. $-50 = (\Delta H) NH_4OH - 57$