Sri Chaitanya IIT Academy.,India.

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A right Choice for the Real Aspirant

ICON Central Office - Madhapur - Hyderabad

SEC: Sr.Super60_NUCLEUS&STERLING_BT JEE-MAIN Date: 12-08-2023
Time: 09.00Am to 12.00Pm RPTM-02 Max. Marks: 300

KEY SHEET

PHYSICS

1)	**4**	2)	**2**	3)	**4**	4)	**4**	5)	**1**
6)	**1**	7)	**2**	8)	**1**	9)	**1**	10)	**1**
11)	**1**	12)	**4**	13)	**3**	14)	**4**	15)	**4**
16)	**2**	17)	**2**	18)	**2**	19)	**3**	20)	**1**
21)	**15**	22)	**40**	23)	**50**	24)	**375**	25)	**625**
26)	**9**	27)	**5**	28)	**12**	29)	**48**	30)	**0**

CHEMISTRY

31	**4**	32	**3**	33	**2**	34	**4**	35	**1**
36	**4**	37	**3**	38	**2**	39	**3**	40	**2**
41	**2**	42	**1**	43	**3**	44	**1**	45	**4**
46	**4**	47	**3**	48	**2**	49	**4**	50	**4**
51	**4**	52	**4**	53	**4**	54	**11**	55	**8**
56	**6**	57	**8**	58	**4**	59	**5**	60	**4**

MATHEMATICS

61)	**2**	62)	**3**	63)	**3**	64)	**1**	65)	**4**
66)	**3**	67)	**1**	68)	**1**	69)	**4**	70)	**2**
71)	**2**	72)	**3**	73)	**1**	74)	**2**	75)	**1**
76)	**3**	77)	**4**	78)	**2**	79)	**3**	80)	**1**
81)	**9**	82)	**2**	83)	**12**	84)	**2**	85)	**3**
86)	**7**	87)	**3**	88)	**8**	89)	**3**	90)	**5**

SOLUTIONS

PHYSICS

1. Conceptual

2. Let m is mass evoperated

$m\times 540=(150-m)\ 80 \quad m=\frac{600}{31}\cong 20gm$

3. Acc to Jouls law $\frac{1}{2}kx^2=J\left[ms\Delta t+Ms\Delta t\right]$

4. If 'θ' Junction temp $\frac{3kA(\theta_2-\theta)}{d}=\frac{kA(\theta-\theta_1)}{3d}$

5. $5M_1+M_1L=50M_2$

6. Apply first law of thermodynamics

7. Conceptual

8. $\theta_1:\theta_2:\theta_3=R_1:R_2:R_3 \qquad =\frac{1}{2}:\frac{3}{5}:\frac{1}{2} \qquad =5:6:5 \quad \theta_2=\frac{6}{16}\times 120^0=45^0C$

9. Energy Flux $\frac{\theta}{At}=\frac{k(\theta_1-\theta_2)}{l}$

10. Principle of Calorimetry

11. According to principle of calorimetry $10m+(m-20)80=2000$

12. According to Thermometry $\frac{t-0}{100-0}=\frac{\frac{x_0}{2}-\frac{x_0}{3}}{x_0-x_0/3}$

13. $\bar{V}$ actual of bird $=V\ \cos 37^0\ \hat{i}+V\sin 37^0\ \hat{j}$

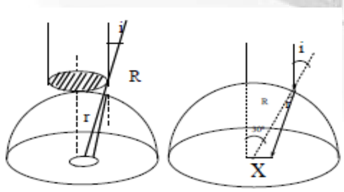
No change in horizontal component

$\bar{V}$ app w.r.t fish $=V\ \cos 37^0\ \hat{i}+\mu V\sin 37^0\,\hat{j}$

$V\ \cos 37^0\ \hat{i}\ +\frac{4}{3}\times V\frac{3}{5}\hat{j}=\frac{4}{5}V\hat{i}+\frac{4}{5}V\hat{j}$

$\therefore$ Bird appears to fly at 45^0 to horizontal.

14. Using Snell's law: $\sin i=\frac{R}{2R}\Rightarrow i=30^0\ \sin i=\mu\sin r\quad \sin r=\frac{1}{2\sqrt{2}}$



$\frac{x}{\sin r}=\frac{R}{\sin(120-r)} \qquad x=\frac{R}{10}\left(\sqrt{21}-1\right)$

15. Normal shift produced by slab is independent of object distance from slab

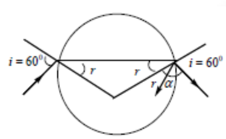
$\therefore V_{app}=V_{actual}=0$

16. $\sin\theta_c = \mu_2/\mu_1$

$$1-\cos^2\theta_c = \left(\frac{\mu_2}{\mu_1}\right)^2 \; 1-\left(\hat{n}\hat{p}\right)^2 = \left(\frac{\mu_2}{\mu_1}\right)^2 \; 1-\left[\frac{4}{\sqrt{25}}\right]^2 = \left(\frac{\mu_2}{\mu_1}\right) \Rightarrow \frac{\mu_2}{\mu_1} = \frac{3}{5} \Rightarrow \mu_2 = \frac{3\sqrt{3}}{5}$$

17. From figure it is clear $\alpha = 180-(i+r)$ and $\mu = \frac{\sin i}{\sin r} \Rightarrow \sqrt{3} = \frac{\sin 60^0}{\sin r}$ $r = 30^0$

$\alpha = 90^0$



18. Let x be the depth of point P from surface

App. depth of point P from surface $x = \frac{x}{\mu}$

App. depth of image of P from surface $= \frac{x+2h}{\mu}$

So, separation between two $= \frac{x+2h}{\mu} - \frac{x}{\mu} \qquad \Rightarrow \frac{2h}{\mu}$

19. $\delta = A(\mu-1)$ Slope of line will be A.

20. $\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \quad \frac{1}{10} = \frac{1}{v} - \frac{1}{-15} \quad \frac{1}{v} = \frac{1}{10} - \frac{1}{-15} = \frac{1}{30}$ v=-30 cm

If rays strike at pole of the mirror u = 0 V = 0

$\therefore$ for 2^{nd} refraction at lens object at pole of mirror gives image at the position of object $\therefore \therefore d = 30cm$

21. Conceptual

22. Principal of calorimetry M (540+60) = 200 (80 + 40)

23. Let $\theta_1, \theta_2, \theta_3$ be temp of water in containers c_1, c_2, c_3

$\theta_1 - 60 = 2(60-\theta_2) \qquad \Rightarrow \theta_1 + 2\theta_2 = 180$

$2(\theta_1 - 60) = 1(60-\theta_3) \qquad \Rightarrow 2\theta_1 + \theta_3 = 180$

$1(\theta_2 - 30) = 2(30-\theta_3) \qquad \Rightarrow \theta_2 + 2\theta_3 = 90$

Solution: $\theta_1 = 80 \qquad \theta_2 = 50 \qquad \theta_3 = 20$

$1(80-\theta) = (\theta-50)+(\theta-20) \qquad \Rightarrow 3\theta = 150 \qquad \theta = 50^0 c$

24. $\frac{1}{f_1} = \left(\frac{3}{2}-1\right)\left(\frac{1}{\infty}+\frac{1}{R}\right) = \frac{1}{2R} 2R = f_1 \Rightarrow R = \frac{f_1}{2} = \frac{25}{4}cm$

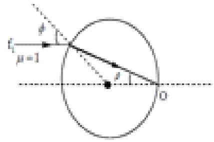
$\frac{1}{f_2} = \left(\frac{4}{3}-1\right)\left(\frac{1}{-R}-\frac{1}{\infty}\right) = -\frac{1}{3R} \; f_2 = -3R = \frac{75}{4}cm$

NOW, $-\frac{1}{F} = \frac{2}{f_1} + \frac{2}{f_2} - \frac{1}{f_m} - \frac{1}{F} = \frac{4}{25} - \frac{8}{75} - \frac{1}{\infty} \Rightarrow F = -\frac{75}{4}cm$

The point object is placed at a distance, $d = \frac{75}{2} = 37.50cm$

25.

$\sin\phi = \mu \sin\beta \cos\beta = \mu/2 = 5/8\left(\sin ce\phi/2 = \beta\right) \therefore 100COS\beta = 100\times\frac{5}{8} = 62.5$

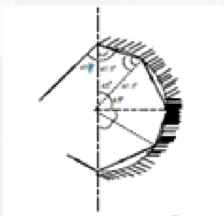


26.

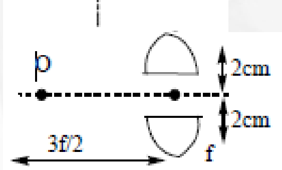
$$\frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2} \Rightarrow \frac{1}{24} = \left[\left(\frac{\mu_1}{\frac{4}{3}} - 1\right)\left(\frac{1}{20} + \frac{1}{20}\right) + \left(\frac{\mu_2}{\frac{4}{3}} - 1\right)\left(\frac{1}{-20} - \frac{1}{20}\right)\right] \Rightarrow$$

$$\left(\mu_1 - \mu_2\right) = \left(\frac{5}{9}\right)$$

27.



28.



For upper part of lens $u = -\frac{3f}{2}, h_0 = 2cm \quad m = \frac{h_i}{h_0} = \frac{f}{f + \left(\frac{-3f}{2}\right)} = 0.5$

$h_i = 2\times 0.5 = 1cm$

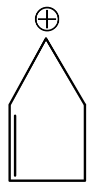
i.e image is formed at a height of 3 cm (i.e 2+1) from main principal axis. (above principal axis) Similarly, for lower part, image is formed 3cm below main principal axis. Hence distance between image = 3+3 = 6 cm.

29. $\frac{3}{2v_1} - \frac{1}{\infty} = \frac{(0.5)}{-20}\frac{2}{f} - \frac{3}{2v_1} = \frac{0.5}{-20}\ \frac{2}{f} = \frac{1}{2}\left(\frac{1}{20} + \frac{1}{30}\right) f = \frac{4\times 20\times 30}{50} = -48cm$

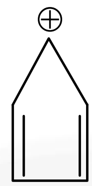
30. Total angular dispersion $= \left(\mu_v - \mu_r\right)A - \left(\mu'_v - \mu'_r\right)A' = 0$

CHEMISTRY

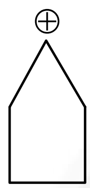
31.



(a) Resonance stabilised



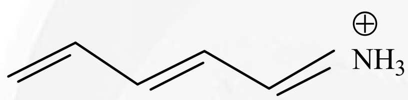
(b) Anti - aromatic



(c) Hyperconjugative stablised

a>c>b

32.



(N can never be pentavalent)

33. $-CH_3$ is better $+H$ group than $-CD_3$

34. $CH_3-\overset{O}{\overset{\|}{C}}-CH_2-\overset{O}{\overset{\|}{C}}-CH_2-CH_3$ having less acidic Hydrogen.

35. Aromatic

36. N is better donor than O.

37. Resonance energy is difference of most stable resonating energy and energy of real molecule.

38. Distance increasing, I-effect decreases.

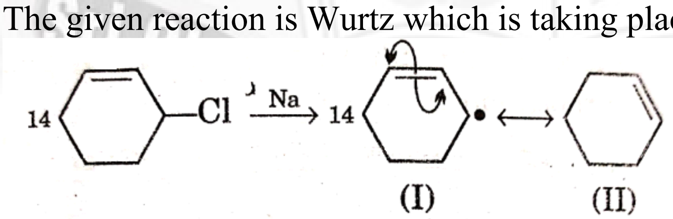
39. Conjugate Acid of Pyrrole is non-aromatic

40. SP^3 carbon

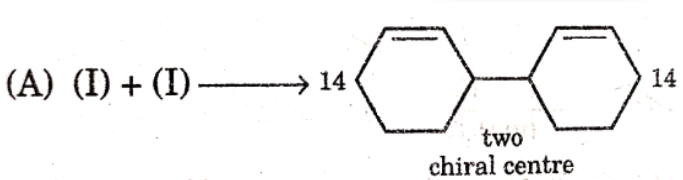
41. Bonds increased; bond length decreases.

42. E D G increasing basic character.

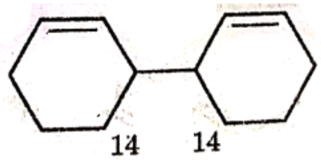
43. The given reaction is Wurtz which is taking place through free radical formation



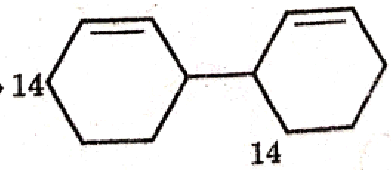
Possible products obtained are



$\therefore$ Number of products = 3 (Symmetrical structure)

(B) (II) + (II) $\longrightarrow$ 

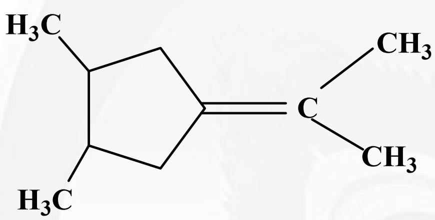
3 products

(C) (I) + (II) $\longrightarrow$ 

Two chiral center with number of symmetry in the molecule.
$\therefore$ Number of products = 4
Total number of products = 3+3+4=10

44. Less stability, more heat of combustion.

45.



46. Functional group more priority

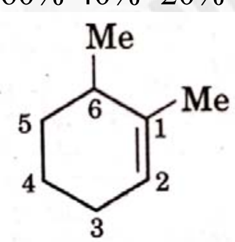
47. Restricted rotation molecule only two stereo isomers possible

48.

: 60%-40%=20% exaticmatric across $20 = \frac{[\alpha]_{mtx}}{-154} \times 100 = -31$

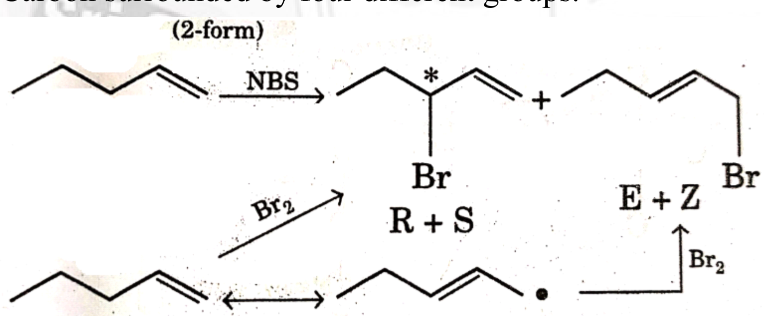
60%-40%=20%

49.

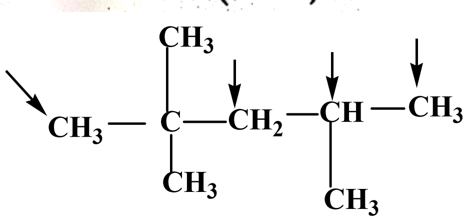


50. Carbon surrounded by four different groups.

51.



52.



53. 1 methyl, 2 methyl and 3 methyl chloro- cyclohexanes can have optical isomerism

So P=12 and $\frac{P}{3}=4$

54. Chiral carbon

55.

Number of stereo centres $=2^n=2^3=8$

56. Number of Alpha acidic Hydrogens.

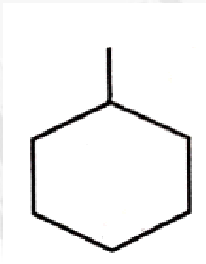
57. Compound

$H_3C-CH=CH-CH=CH-CH=C=C=C-CH_3$

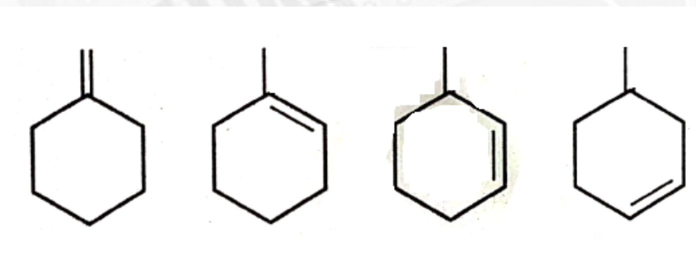
Has three geometrical centre and is unsymmetrical thus, total

$G.I.=2^3=8.$

58.

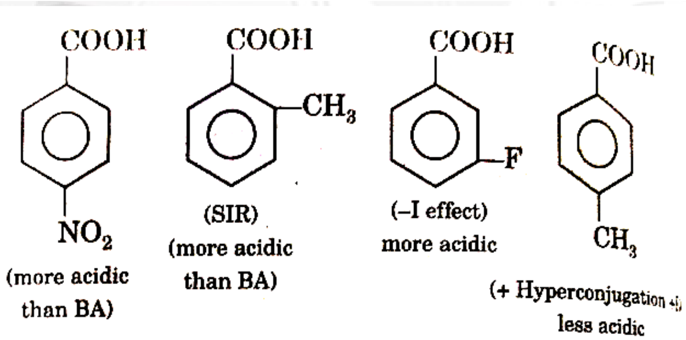
Cyclic alkenes $\xrightarrow[\text{Hydrogenation}]{\text{(4) Catalytic}}$ 

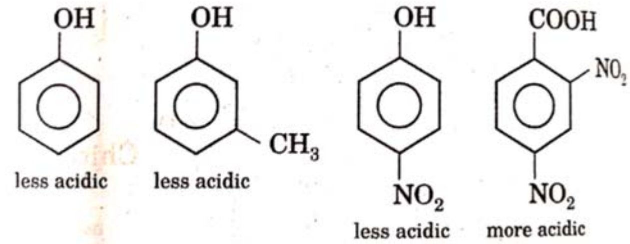
Possible cyclic alkenes



(4)

59.

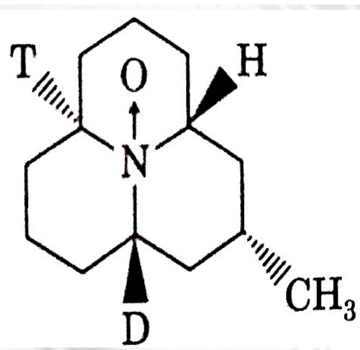




$$\underset{\text{more acidic}}{H-\underset{\underset{O}{\|}}{C}-OH} \qquad \underset{\text{less acidic}}{H_3C-\underset{\underset{O}{\|}}{C}-OH}$$

Acidic strength order:

$$H-\underset{\underset{O}{\|}}{C}-OH > Ph-\underset{\underset{\underset{\text{slightly}}{-I < +M}}{O}}{\overset{\|}{C}}-OH > \underset{-I}{CH_3}-COOH$$

60. 

MATHEMATICS

61. $P(4t_1^2+1, 8t_1^3-1) \quad Q(4t_2^2+1, 8t_2^3-1)$

$\frac{dy}{dx} = \frac{24t^2}{8t} = 3t$

Slope of tangent at P is $m_1 = 3t_1$

Slope of tangent at Q is $m_2 = 3t_2$

$m_1 m_2 = -1$

$9t_1 t_2 = -1$ ----(1)

Eq. of tangent at P is $3t_1 x - y = 4t_1^3 + 3t_1 + 1$

If passes through Q

$\therefore (\frac{t_1}{t_2})^3 - 3(\frac{t_1}{t_2}) + 2 = 0$

$\therefore \frac{t_1}{t_2} = -2$ ----(2)

From $(1) \& (2) t_1 = -\frac{\sqrt{2}}{3}$

The normal at Q is tangent at the point P

$\therefore 27(\sqrt{2}x + y) = 35\sqrt{2} - 27$

62.
$$\text{Let } y = \left(\frac{\sqrt{3e}}{2\sin x}\right)^{\sin^2 x}$$

$$\ln y = \sin^2 x . \ln\left(\frac{\sqrt{3e}}{2\sin x}\right)$$

$$\frac{1}{y}y' = \ln\left(\frac{\sqrt{3e}}{2\sin x}\right) 2\sin x\cos x + \sin^2 x \frac{2\sin x}{\sqrt{3e}}\frac{\sqrt{3e}}{2}(-\operatorname{cosec}x\cot x)$$

$$\frac{dy}{dx} = 0 \Rightarrow \ln\left(\frac{\sqrt{3e}}{2\sin x}\right) 2\sin x\cos x - \sin x\cos x = 0$$

$$\Rightarrow \sin x\cos x\left[2\ln\left(\frac{\sqrt{3e}}{2\sin x}\right) - 1\right] = 0$$

$$\Rightarrow \ln\left(\frac{3e}{4\sin^2 x}\right) = 1 \Rightarrow \frac{3e}{4\sin^2 x} = e \Rightarrow \sin^2 x = \frac{3}{4}$$

$$\Rightarrow \sin x = \frac{\sqrt{3}}{2}\left(as\ x \in \left(0, \frac{\pi}{2}\right)\right)$$

$$\Rightarrow local\ \max\ value = \left(\frac{\sqrt{3e}}{\sqrt{3}}\right)^{3/4} = e^{3/8} = \frac{k}{e}$$

$$\Rightarrow k^8 = e^{11} \Rightarrow \left(\frac{k}{e}\right)^8 + \frac{k^8}{e^5} + k^8 = e^3 + e^6 + e^{11}$$

63. $h = 3R \; \frac{dh}{dt} = 3\frac{dR}{dt}$

$V = \frac{1}{3}\pi R^2.2R + \frac{2}{3}\pi R^3 \Rightarrow V = \frac{4}{3}\pi R^3 \Rightarrow \frac{dv}{dt} = 2\pi R^2 \frac{dR}{dt}\,\frac{dv}{dt} = 4\pi.\frac{h^2}{9}\times\frac{1}{3}\frac{dh}{dt}$

$= 4\pi\frac{81}{27}\times\frac{dh}{dt} = 12\pi$

64. $F(x) = \frac{x^{101}}{2} - 23x^{101} - \frac{45x^2}{2} + 1035x$

$F(x) = \frac{x}{2}\left(x^{100} - 45\right)(x - 46)$

65. I: $f(x) = x$ and $g(x) = -x^2$ on R

II: $f(x) = \frac{1}{x}, x > 0$

66. $f(c)\begin{cases} \frac{1}{x;} & \text{if } x^2 > 1 \quad \Rightarrow x < -1 \quad or \; x > 1 \\ ax^3 + bx^2; & \text{if } 0 \le x^2 < 1 \quad \Rightarrow -1 < x < 1 \\ \frac{1/x + ax^3 + bx^2}{2}; \text{if } x^2 = 1 & \end{cases}$

$\because$ f is continuous

$\therefore$ $at\; x = 1$

and $at\; x = -1$

$1 = a + b$

$\therefore b = 0 \; \frac{-1 = -a + b}{and \quad a = 1}$ ....(1)

.......(2)

$\therefore$ point A and B are $= (-1, 3)$ and $(1, 1)$.

$\therefore$ $g'(x) = \lambda(x-1)(x+1)$

$g(x) = \lambda\left(\frac{x^3}{3} - x\right) + c$

$g(-1) = \frac{2\lambda}{3} + c = 3$

$\frac{g(1) = -\frac{2\lambda}{3} + c = -1}{c = 1 \quad \text{and}}$ $\lambda = 3$ ....(3)

$\therefore$ $g(x) = x^3 - 3x + 1$

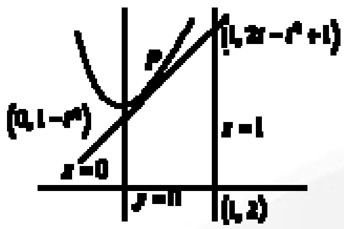
$\therefore$ $g(2) = 3$

67. $P(t, t^2 + 1)$

Tangent at P is $y = 2tx + 1 - t^2$

Area of trapezium $= \frac{1}{2}|2 + 2t - 2t^2| = |1 + t - t^2|$

Max area if $t=\frac{1}{2}$



68. $y=\frac{2}{3}x^3+\frac{1}{2}x^2 \qquad \therefore \frac{dy}{dx}=\frac{2}{3}3x^2+\frac{1}{2}2x=2x^2+x$

Since the tangent makes equal angles with the axes.

$\Rightarrow \frac{dy}{dx}=\pm 1 \Rightarrow 2x^2+x=\pm \Rightarrow 2x^2+x-1=0$ $(2x^2+x+1=0$ has no real roots)

$\Rightarrow (2x-1)(x+1)=0 \qquad \Rightarrow x=\frac{1}{2}$ or $x=-1$

69. $y^2=x^2+(150)^2$

When y=250$\Rightarrow$x=200 meters

$2y.\frac{dy}{dt}=2x.\frac{dx}{dt}\ \frac{dy}{dt}=\frac{x}{y}.\frac{dx}{dt}=\frac{200}{250}\times 10=8\,meters/\sec$

70. $(i)4x^2+11x+6>0\ x\in(-\infty,-2)\cup\left(\frac{-3}{4},\infty\right)$

$(ii)4x+3\in[-1,1]\ x\in[-1,-1/2]$

$(iii)\frac{10x+6}{3}\in[-1,1]$

$x\in\left[\frac{-9}{10},\frac{-3}{10}\right]\ x\in\left(\frac{-3}{4},\frac{-1}{2}\right] \quad \alpha=\frac{-3}{4},\beta=\frac{-1}{2}$

$\alpha+\beta=\frac{-5}{4}\ 36|\alpha+\beta|=45$

71. $l=\underset{x\to 0}{Lt}\frac{\sin 3x}{x}=3,\ m=\underset{x\to 0}{Lt}\frac{2\tan x}{x(1+\tan^2 x)}=2$

The quadratic equation whose roots area 3, 2 is

$x^2-(3+2)x+3.2=0\Rightarrow x^2-5x+6=0$

72. h(x) graph has sharp edge at x=x $_0$ if f(x$_0$) =g(x$_0$)

73. $f(g(x))=\frac{x^4}{(1-x^2)(1-2x^2)}$

Dis. Cont. at $x=\pm\frac{1}{\sqrt{2}},0,\pm 1.$

74. : (1) is true

$\lim_{h\to 0}\frac{f(c+h)-f(c)+f(c)-f(c-h)}{h}$

$\lim_{h\to 0}\frac{f(c+h)-f(c)}{h}+\lim_{h\to 0}\frac{f(c-h)-f(c)}{-h}$

$f^2(c)+f^2(c)$

$=2f'(c)$ (f is differentiable)

(2) is false

75. (a)$\because$ $f(x)$

$\therefore$ fourth derivative is also odd.

$\therefore$ $f(0)=0$

76. $f'(x)=6x^2-30x+36=6(x^2-5x+6)=6(x-3)(x-2)$

$f'(x)=0 at x=2,3,$ so that this is not one – one.

Range of $f(x) is [1,29]$, this is into.

77. For $\alpha>0$, $f(x)$ will into if;

$2.2+\alpha^2>\alpha.\frac{2}{2}+10$ $\Rightarrow$ $\alpha^2-\alpha-6>0$

$\Rightarrow$ $(\alpha-3)9\alpha+2>0$ $\Rightarrow$ $\alpha^2-\alpha-6>0$

$\therefore$ $\alpha_{\min}=4$

78. Let $g(x)=(x^{2023}+1)|(x-5)(x+1)|$ not derivable at x=5

Let $h(x)=\sin(|x|)$ not derivable at x=0

And let $s(x)=\cos(|x-1|)$ derivable everywhere

$\therefore f(x)=g(x)+h(x)+s(x)$ not derivable at 0 and 5 (two point)

79. CONCEPTUAL

80. Let $f^{-1}(x)=h(x)$

$\therefore$ $g'(x)=\frac{-1}{h^2(x)}.h'(x)$

$\Rightarrow g'(4)=\frac{-1}{h^2(4)}.h'(4)$ where $h'(f(x))=\frac{1}{f'(x)}$

$\Rightarrow h'(4)=\frac{1}{f'(3)}=\frac{3}{4}=\frac{-1}{9}.\frac{3}{4}=\frac{-1}{12}$

81. $f\left(\frac{3}{2}\right)=0\Rightarrow \lim_{x\to\frac{3}{2}}|x^2-3x|+a\le 0$

$a\le-\frac{9}{4}$

Hence, $|4k|=9$

82. Hint: $f(x)=30-2x-x^3$

$f(x)=-2-3x^2<0\Rightarrow f(x)$ is decreasing function

Hence $f(f(f(x)))>f(f(-x))\Rightarrow f(f(x))<f(-x)$

$\Rightarrow f(x)>-x$

$\Rightarrow 30-2x-x^3 > -x \Rightarrow x^3+x-30<0 \Rightarrow (x-3)\left(x^2+3x+10\right)<0$

$\Rightarrow x<3$

83. $\left(x^2+1\right)(y-3)=x \quad \Rightarrow y=3+\dfrac{x}{x^2+1}$

$m=\dfrac{dy}{dx}=\dfrac{1-x^2}{\left(1+x^2\right)^2} \qquad \Rightarrow \dfrac{dm}{dx}=\dfrac{-2x\left(3-x^2\right)}{\left(1+x^2\right)^2}$

For extremum $f'(x)=0$; x=0, $x=\pm\sqrt{3}$;x=0, y=3 (0,3);

$x=\sqrt{3}, y=3+\dfrac{\sqrt{3}}{4} \quad \left(\sqrt{3},3+\dfrac{\sqrt{3}}{4}\right)$

$x=-\sqrt{3}, y=3-\dfrac{\sqrt{3}}{4} \quad \left(\sqrt{3},3-\dfrac{\sqrt{3}}{4}\right)$

84. $\dfrac{dy}{dx}=\dfrac{1-\cos x}{2\sqrt{x+\sin x}}=0 \Rightarrow \cos x=1 \Rightarrow x=0,\pm 2\pi,\pm 4\pi....$

$\therefore x\in[-10,10] \Rightarrow x=0,\pm 2\pi$; For x = 0, y = 0; $\left.\begin{matrix} x=0, y=0 \\ x=2\pi, y=\pm\sqrt{2\pi}\end{matrix}\right\}$ they satisfy $-3\le y\le 3$

$x=-2\pi, y^2=-2\pi$

Also, slope at $(0,0)$ is undefined hence points are $(2\pi,2\pi)$ and $\left(2\pi,-\sqrt{2\pi}\right)$

85. $f(1)=f(2) \Rightarrow 1+m+n=8+4m+2n \Rightarrow 3m+n+7=0.$

$f^1(C)=0 \Rightarrow 3C^2+2mC+n=0 \Rightarrow \dfrac{16}{3}+\dfrac{8m}{3}+n=0 (C=\dfrac{4}{3})$

$\Rightarrow 8m+3n+16=0$ on solving we get $m=-5, n=8$ Hence m + n = 3

86. Use L'Hopital Rule

87.
$$g(x)=\begin{cases} x^2+2x+5, & x<0 \\ 2x^2-6x+4, & 0\le x<1 \\ 0, & 1\le x<2 \\ 2x^2-6x+4, & x\ge 2 \end{cases}$$

88. $f(x)=\dfrac{1}{3}\left(x^2-4x+3\right)$

89. $g(x)=x^2$ (but $y=0$)

90. $f(x)=2\sin\left(x-\dfrac{\pi}{2}\right)+2$

$\Rightarrow [\alpha,\beta]=[3,4]$ and n= 6, m = 2