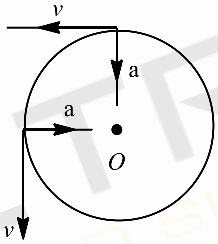
FULL TEST – 01
PART- A (PHYSICS)
KEY AND SOLUTION

1. **(a)** $E=\frac{1}{2}Li^2$ hence$L=[ML^2T^{-2}A^{-2}]$
2. **(a)** Distance between the balls = Distance travelled by first ball in 3 seconds – Distance travelled by second ball in 2 seconds = $\frac{1}{2}g(3)^2-\frac{1}{2}g(2)^2=45-20=25\ m$
3. **(c)** An object moving in uniform circular motion is moving around the perimeter of the circle with a constant speed. While the speed of object is constant, its velocity is changing. Velocity being a vector quantity has a constant magnitude but a changing direction. The direction is always directed tangent line is always pointing in a new direction. Also when it is moving in circular motion towards the centre, hence acceleration is perpendicular to velocity.

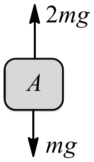


4. **(a)** By conservation of energy, $mgh=\frac{1}{2}mv^2\ \Rightarrow v=\sqrt{2gh}=\sqrt{2\times 9.8\times 1}=\sqrt{19.6}=4.43\ m/s$
5. **(b)**

For $A,\ T=f=2mg$

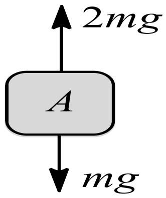
$2mg-mg=ma_1$

$\therefore\ a_1=g$



For B,

From force diagram shown in figure,



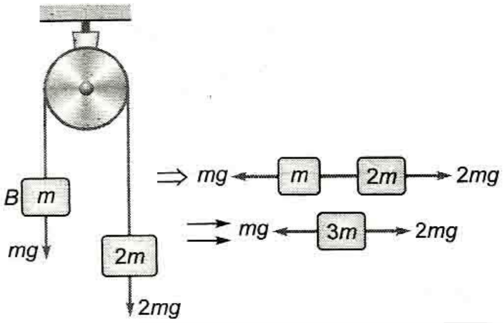
$2mg - mg = 3ma_2$

$a_2 = \frac{g}{3}$

For C,

$\therefore 2mg - mg = 2ma_3$

$\therefore\ a_3 = \frac{g}{2}$



So, $a_1 > a_3 > a_2$

6. **(b)**

Gravitational potential energy of ball gets converted into elastic potential energy of the spring

$mg(h + d) = \frac{1}{2}Kd^2$

$W = \Delta U$

Net work done $= mg(h + d) - \frac{1}{2}Kd^2$

7. (d)

For a ring $K^2 = r^2$ then

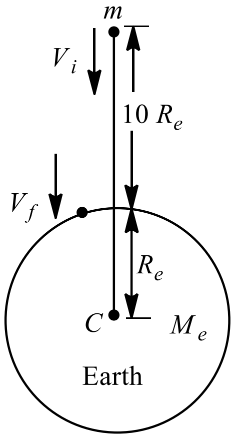
$$v^2 = \sqrt{\frac{2gh}{1 + \frac{K^2}{r^2}}}$$

$$\therefore v^2 = \frac{2gh}{2} = gh$$

$$v = \sqrt{gh}$$

8. (c)

Applying law of conservation of energy for asteroid at a distance 10 R_e and at earth's surface.



$K_i + U_i = K_f + U_f$ ....(i)

Now, $K_f = \frac{1}{2} m v_i^2$ and $U_i = -\frac{GM_e m}{10R_e}$

$K_f = \frac{1}{2} m v_f^2$ and $U_f = -\frac{GM_e m}{R_e}$

Substituting these values in Eq. (i), we get

$$\frac{1}{2} m v_i^2 - \frac{GM_e m}{10R_e} = \frac{1}{2} m v_f^2 - \frac{GM_e m}{R_e}$$

$$\Rightarrow \frac{1}{2} m v_f^2 = \frac{1}{2} m v_i^2 + \frac{GM_e m}{R_e} - \frac{GM_e m}{10R_e}$$

$$\Rightarrow v_f^2 = v_i^2 + \frac{2GM_e}{R_e} - \frac{2GM_e}{10R_e}$$

$$\therefore \quad v_f^2 = v_i^2 + \frac{2GM_e}{R_e}\left(1 - \frac{1}{10}\right)$$

9. (a)

$l = \frac{FL}{AY} \therefore l \propto \frac{1}{r^2}$ [Y, $L$and$F$ are constant]

*i.e.*for the same load, thickest wire will show minimum elongation. So graph D represent the thickest wire

10. (a)

For air, $\eta \propto \sqrt{T}$

11. (a)

According to Newton's law of cooling

$$\frac{\theta_1 - \theta_2}{t} = K\left[\frac{\theta_1 + \theta_2}{2} - \theta_0\right]$$

In the first case,

$$\Rightarrow \frac{60 - 50}{10} = K\left[\frac{60 + 50}{2} - \theta_0\right]$$

$\Rightarrow \quad 1 = K(55 - \theta)$...(i)

In the second case,

$$\Rightarrow \frac{50-42}{10} = K\left[\frac{50+42}{2} - \theta_0\right]$$

$\Rightarrow 0.8 = K[46-\theta]$...(ii)

Dividing Eq. (i) by Eq. (ii), we get

$$\frac{1}{0.8} = \frac{55-\theta}{46-\theta}$$

or$46 - \theta = 44 - 0.8\theta$

$$\Rightarrow \theta = 10$$

12. (d)

Temperature of interface $T = \frac{K_1\theta_1 + K_2\theta_2}{K_1 + K_2}$

$$= \frac{300 \times 100 + 200 \times 0}{300 + 200} = 60°\text{C}$$

13. **(c)**

Efficiency, $\eta = 1 - \frac{T_2}{T_1} = 1 - \frac{500}{800}$

$$= \frac{3}{8} = 0.375$$

14. **(d)**

$$C_P = \left(\frac{f}{2} + 1\right)R = \left(\frac{5}{2} + 1\right)R = \frac{7}{2}R$$

15. **(d)** In between mean position and extreme position once KE and PE become equal. In one cycle such four situation will come.

16. (c)

For open pipe $f_1 = \frac{v}{2l}$ and for closed pipe

$$f_2 = \frac{v}{4 \times \left(\frac{l}{4}\right)} = \frac{v}{l} = 2f_1 \Rightarrow \frac{f_1}{f_2} = \frac{1}{2}$$

17. (d)

Work done $W = U_f - U_i$

$U_i = \frac{1}{2}CV_0^2$and$\mathrm{U_f} = \frac{1}{2}\frac{(C)}{3}.(3V_0)^2 = 3 \times \frac{1}{2}CV_0^2$

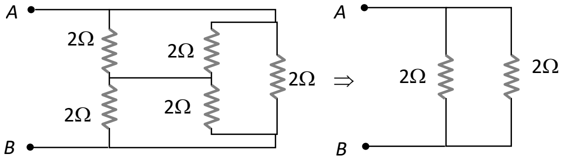
So $W = \frac{\varepsilon_0 A V_0^2}{d}$

18. (c)

Electric field at a distance R is only due to sphere because electric field due to shell inside it is always zero

Hence electric field $= \frac{1}{4\pi\varepsilon_0}.\frac{3Q}{R^2}$

19. (a)



$$R_{AB} = \frac{2 \times 2}{2 + 2} = 1\Omega$$

20. (a)

Voltage sensitivity $= \frac{Q}{V}$

Current sensitivity $= \frac{Q}{I}$

Also, potential difference

$V = IG$

Hence, $\frac{V_S}{I_S} = \frac{\alpha/V}{\alpha/I} = \frac{I}{V} = \frac{I}{IG}$

$$\therefore \frac{V_s}{I_s} = \frac{1}{G}$$

21. (d)

Potential difference between A and B

$V_A - V_B = 1 \times 1.5$

$\Rightarrow V_A - 0 = 1.5V \Rightarrow V_A = 1.5V$

Potential difference between B and C

$V_B - V_C = 1 \times 2.5 = 2.5V$

$\Rightarrow 0 - V_C = 2.5V \Rightarrow V_C = -2.5V$

Potential difference between C and D

$$V_C - V_D = -2V \Rightarrow -2.5 - V_D = -2 \Rightarrow V_D = -0.5V$$

22. (c)

$B_1/B_2 = r_2/r_1$or$B_2 = B_1 r_1/r_2$

$= 10^{-3} \times 4/1 = 4 \times 10^{-3}$ T

23. (d)

Magnetic force on straight wire

$F = Bil \sin\theta = Bil \sin 90° = Bil$

For equilibrium of wire in mid-air,

$F = mg$

$Bil = mg$

$\therefore B = \frac{mg}{il} = \frac{200 \times 10^{-3} \times 9.8}{2 \times 1.5} = 0.65$ T

24. (b)

Induced potential difference between two ends $= Blv = B_H lv$

$= 3 \times 10^{-5} \times 2 \times 50 = 30 \times 10^{-3} volt = 3\ millivolt$

By Fleming's right hand rule, end A becomes positively charged

25. (a)

The instantaneous value of voltage is

$E = 100\sin(100t)\,V$ ... (i)

Compare it with $E = E_0 \sin(\omega t)\,V$

We get

$E_0 = 100V, \omega = 100 rads^{-1}$

The rms value of voltage is

$$E_{rms} = \frac{E_0}{\sqrt{2}} = \frac{100}{\sqrt{2}}V = 70.7V$$

The instantaneous value of current is

$$I = 100\sin\left(100t + \frac{\pi}{3}\right) mA$$

Compare it with

$I = I_0 \sin(\omega t + \phi)$

We get

$I_0 = 100mA, \omega = 100\text{rads}^{-1}$

The rms value of current is

$$I_{rms} = \frac{I_0}{\sqrt{2}} = \frac{100}{\sqrt{2}} mA = 70.7mA$$

26. (d)

$$B_0 = \frac{E_0}{c} = \frac{9 \times 10^3}{3 \times 10^8} = 3 \times 10^{-5}\ \text{T}$$

27. (a)

$$\frac{f_l}{f_a} = \frac{{}_a\mu_g - 1}{{}_l\mu_g - 1} = \frac{1.5 - 1}{\frac{1.5}{1.75} - 1} = -\frac{1.75 \times 0.50}{0.25} = -3.5$$

$\therefore f_l = -3.5\, f_a \Rightarrow f_l = +3.5R\ [\because f_a = R]$

Hence on immersing the lens in the liquid, it behaves as a converging lens of focal length 3.5 R

28. (a)

29. (d)

Here, $\frac{I_1}{I_2} = \frac{16}{9}$

Since, intensity $\propto$ (amplitude)^2

$$\therefore \frac{I_1}{I_2} = \left(\frac{A_1}{A_2}\right)^2 = \frac{16}{9}$$

Or $\frac{A_1}{A_2} = \sqrt{\frac{16}{9}} = \frac{4}{3}$

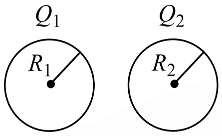
$$\frac{I_{\max}}{I_{\min}} = \frac{(A_1 + A_2)^2}{(A_1 - A_2)^2} = \frac{\left(\frac{A_1}{A_2} + 1\right)^2}{\left(\frac{A_1}{A_2} - 1\right)^2}$$

$$= \frac{\left(\frac{4}{3} + 1\right)^2}{\left(\frac{4}{3} - 1\right)^2} = \frac{49}{1}$$

30. (a)

$$p = \frac{hv}{c} = \frac{6.6 \times 10^{-34} \times 1.5 \times 10^{13}}{3 \times 10^8} = 3.3 \times 10^{-29} kg - m/s$$

31. (a)



Let Q_1 and Q_2 are the charges on sphere of radii R_1 and R_2 respectively. Surface charge density $\sigma = \frac{\text{Charge}}{\text{Area}}$

According to given problem, $\sigma_1 = \sigma_2$

$$\frac{Q_1}{4\pi R_1^2} = \frac{Q_2}{4\pi R_2^2}$$

$\therefore \frac{Q_1}{Q_2} = \frac{R_1^2}{R_2^2}$...(i)

In case of a charged sphere, $V_s = \frac{1}{4\pi\varepsilon_0}\frac{Q}{R}$

$$\therefore V_1 = \frac{1}{4\pi\varepsilon_0}\frac{Q_1}{R_1}, V_2 = \frac{1}{4\pi\varepsilon_0}\frac{Q_2}{R_2}$$

$$\Rightarrow \frac{V_1}{V_2} = \frac{Q_1}{R_1} \times \frac{R_2}{Q_2} = \frac{Q_1}{Q_2} \times \frac{R_2}{R_1}$$

$= \left(\frac{R_1}{R_2}\right)^2 \times \left(\frac{R_2}{R_1}\right) = \frac{R_1}{R_2}$...[Using(i)]

32. (a)

$$\frac{1}{\lambda_{\text{Balmer}}} = R\left[\frac{1}{2^2} - \frac{1}{3^2}\right] = \frac{5R}{36}, \frac{1}{\lambda_{\text{Lyman}}} = R\left[\frac{1}{1^2} - \frac{1}{2^2}\right] = \frac{3R}{4}$$

$$\therefore \lambda_{\text{Lyman}} = \lambda_{\text{Balmer}} \times \frac{5}{27} = 1215.4\ \text{Å}$$

33. (d)

$$ {}_{48}Cd^{115} \xrightarrow{2(\ {}_{-1}\beta^{0})} {}_{50}Sn^{115} $$

34. (c)

$eV_0 = hv - hv_0$

∴ Threshold frequency,

$$v_0 = v - \frac{eV_0}{h}$$

$$= \frac{c}{\lambda} - \frac{eV_0}{h}$$

$$\therefore \qquad v_0 = \frac{3 \times 10^8}{2 \times 10^{-7}} - \frac{1.6 \times 10^{-19} \times 2.5}{6.6 \times 10^{-34}}$$

$$= 9.0 \times 10^{14}\ Hz$$

35. (c)A p-type material is electrically neutral.

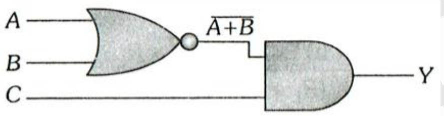
36. (c) Voltage gain $= \frac{\text{Output voltage}}{\text{Input voltage}}$

$\Rightarrow V_{out} = V_{in} \times$ Voltage gain

$\Rightarrow V_{out} = V_{in} \times$ Current gain $\times$ Resistance gain

$= V_{in} \times \beta \times \frac{R_L}{R_{BE}} = 10^{-3} \times 100 \times \frac{10}{1} = 1V$

37. (d)



The output Y is

$Y = \overline{(A+B)} \cdot C$

The truth table of the given circuit is as shown in the table

A	B	C	$\overline{A+B}$	$Y = \overline{(A+B)}.C$
0	0	0	1	0
0	0	1	1	1
0	1	0	0	0
0	1	1	0	0
1	0	0	0	0
1	0	1	0	0
1	1	0	0	0
1	1	1	0	0

38. (b)$R_{max} = \frac{u^2}{g}$

During this journey $H = \frac{u^2 sin^2 45}{2g} = \frac{u^2}{4g} = \frac{R_{max}}{4} = \frac{87.58}{4} = 21.90\ m$

39. (c) $W = \frac{1}{2}k(x_2^2 - x_1^2) = \frac{1}{2} \times 5 \times 10^3(10^2 - 5^2) \times 10^{-4} = 18.75\,J$

40. (c)

Time period is independent of mass of pendulum

41. (d)

42. (c)

43. (d)

44. (a)

As the two bright fringes coincide

$\therefore \; n\lambda_1 = (n+1)\lambda_2$

$$\frac{n+1}{n} = \frac{\lambda_1}{\lambda_2} = \frac{7500}{6000} = \frac{5}{4}$$

$$1 + \frac{1}{n} = \frac{5}{4}, n = 4$$

45. (c)

$r = \frac{\sqrt{2mK}}{qB}$ and $A = \pi r^2 \Rightarrow A = \frac{\pi(2mK)}{q^2B^2} \Rightarrow A \propto K$

46. (a)

When a listener moves towards a stationary source apparent frequency
$n' = \left(\frac{v+v_O}{v}\right)n = 200$...(i)
When listener moves away from the same source
$n" = \frac{(v-v_O)}{v}n = 160$...(ii)
From (i) and (ii)
$$\frac{v+v_O}{v-v_O} = \frac{200}{160} \Rightarrow \frac{v+v_O}{v-v_O} = \frac{5}{4} \Rightarrow v = 360m/sec$$

47. (c)

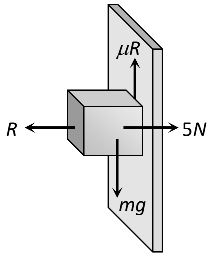
Amplitude of $ac = i_0 = \frac{V_0}{R} = \frac{\omega NBA}{R} = \frac{(2\pi v)NB(\pi r^2)}{R}$

$$\Rightarrow i_0 = \frac{2\pi \times \frac{200}{60} \times 1 \times 10^{-2} \times \pi \times (0.3)^2}{\pi^2} = 6\,mA$$

48. (b) Number of photoelectrons $\propto$ Intensity

Maximum kinetic energy is independent of intensity

49. (b) Limiting friction $F_1 = \mu_s R = 0.5 \times (5) = 2.5\,N$



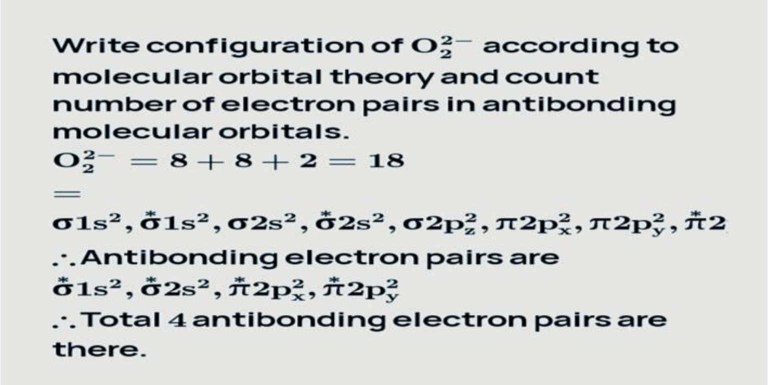
Since downward force is less than limiting friction therefore block is at rest so the static force of friction will work on it

$$F_s = \text{downward force} = \text{Weight} = 0.1 \times 9.8 = 0.98\ N$$

50. (a) The resultant force on the system is zero. So, the centre of mass of system has no acceleration

CHEMISTRY (FULL TEST -1)

51. (c)



Write configuration of O_2^{2-} according to molecular orbital theory and count number of electron pairs in antibonding molecular orbitals.

$O_2^{2-} = 8 + 8 + 2 = 18$

$=$

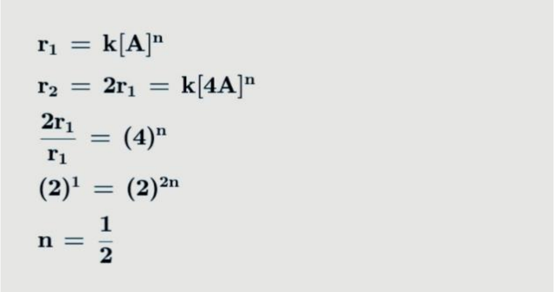
$\sigma 1s^2, \overset{*}{\sigma}1s^2, \sigma 2s^2, \overset{*}{\sigma}2s^2, \sigma 2p_z^2, \pi 2p_x^2, \pi 2p_y^2, \overset{*}{\pi}2$

∴ Antibonding electron pairs are

$\overset{*}{\sigma}1s^2, \overset{*}{\sigma}2s^2, \overset{*}{\pi}2p_x^2, \overset{*}{\pi}2p_y^2$

∴ Total 4 antibonding electron pairs are there.

52. (c)



$$r_1 = k[A]^n$$

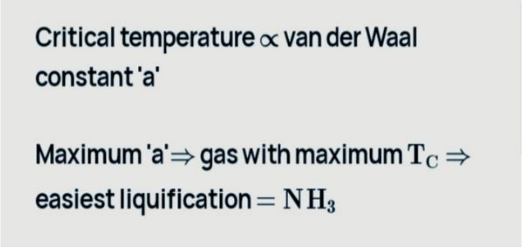
$$r_2 = 2r_1 = k[4A]^n$$

$$\frac{2r_1}{r_1} = (4)^n$$

$$(2)^1 = (2)^{2n}$$

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

53. (a)



Critical temperature $\propto$ van der Waal constant 'a'

Maximum 'a' $\Rightarrow$ gas with maximum $T_C \Rightarrow$ easiest liquification $= NH_3$

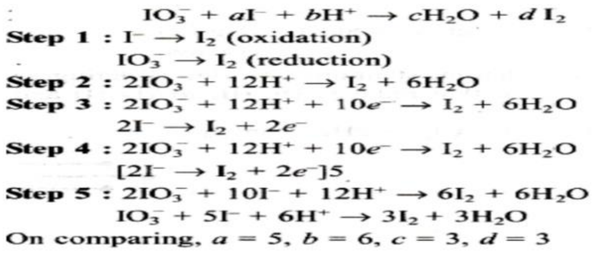
54. (d)

Magetic moment *μ √n(n + 2)*

where n = number of unpaired electrons

√15 = √n(n + 2) ∴ n = 3

55. (a)



$$IO_3^- + aI^- + bH^+ \rightarrow cH_2O + d\,I_2$$

Step 1 : $I^- \rightarrow I_2$ (oxidation)

$IO_3^- \rightarrow I_2$ (reduction)

Step 2 : $2IO_3^- + 12H^+ \rightarrow I_2 + 6H_2O$

Step 3 : $2IO_3^- + 12H^+ + 10e^- \rightarrow I_2 + 6H_2O$

$2I^- \rightarrow I_2 + 2e^-$

Step 4 : $2IO_3^- + 12H^+ + 10e^- \rightarrow I_2 + 6H_2O$

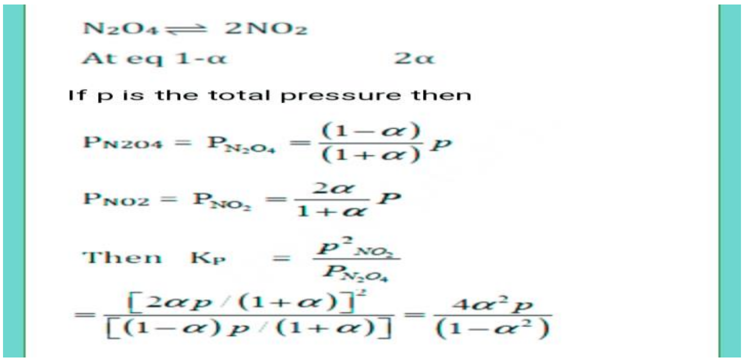
$[2I^- \rightarrow I_2 + 2e^-]5$

Step 5 : $2IO_3^- + 10I^- + 12H^+ \rightarrow 6I_2 + 6H_2O$

$IO_3^- + 5I^- + 6H^+ \rightarrow 3I_2 + 3H_2O$

On comparing, $a = 5$, $b = 6$, $c = 3$, $d = 3$

56. (d)



$N_2O_4 \rightleftharpoons 2NO_2$

At eq $1-\alpha$ 2α

If p is the total pressure then

$$P_{N2O4} = P_{N_2O_4} = \frac{(1-\alpha)}{(1+\alpha)}p$$

$$P_{NO2} = P_{NO_2} = \frac{2\alpha}{1+\alpha}p$$

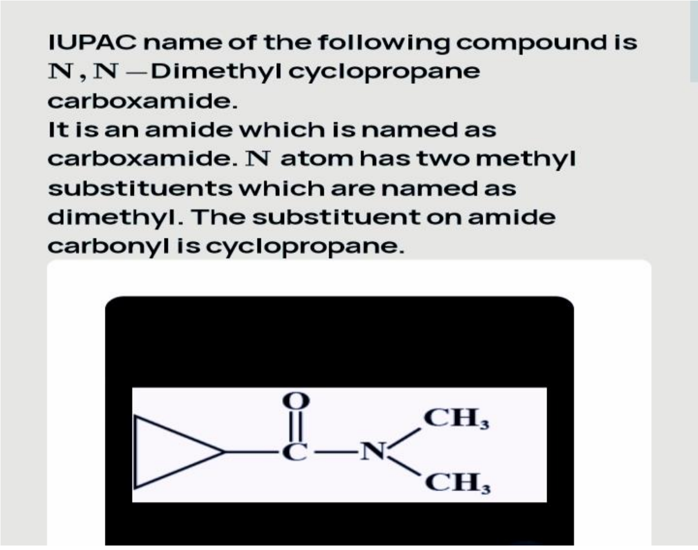
$$\text{Then } K_P = \frac{P^2{}_{NO_2}}{P_{N_2O_4}}$$

$$= \frac{[2\alpha p/(1+\alpha)]^2}{[(1-\alpha)p/(1+\alpha)]} = \frac{4\alpha^2 p}{(1-\alpha^2)}$$

57. (c)

58. (a)

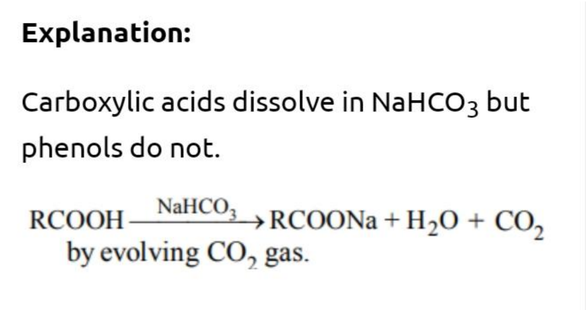
59. (a)



IUPAC name of the following compound is N , N —Dimethyl cyclopropane carboxamide.

It is an amide which is named as carboxamide. N atom has two methyl substituents which are named as dimethyl. The substituent on amide carbonyl is cyclopropane.

60. (d)



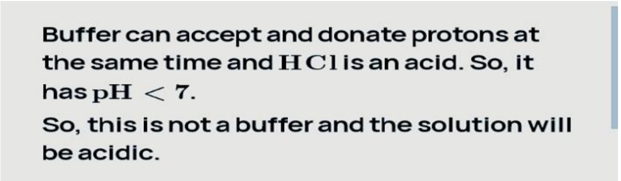
Explanation:

Carboxylic acids dissolve in $NaHCO_3$ but phenols do not.

$$RCOOH \xrightarrow{NaHCO_3} RCOONa + H_2O + CO_2$$

by evolving CO_2 gas.

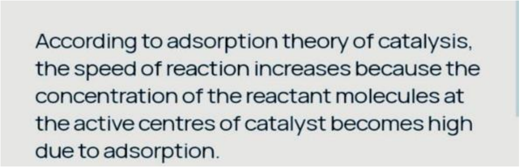
61. (a)



Buffer can accept and donate protons at the same time and HCl is an acid. So, it has $pH < 7$.

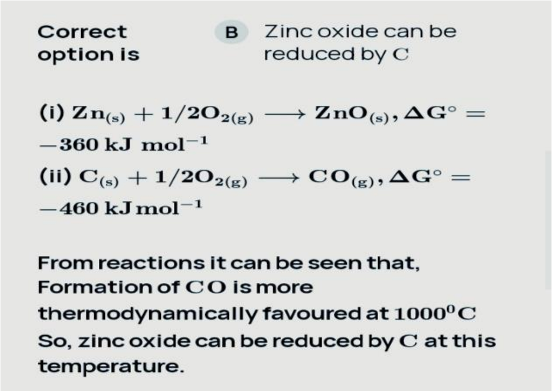
So, this is not a buffer and the solution will be acidic.

62. (d)



According to adsorption theory of catalysis, the speed of reaction increases because the concentration of the reactant molecules at the active centres of catalyst becomes high due to adsorption.

63. (b)



Correct option is B Zinc oxide can be reduced by C

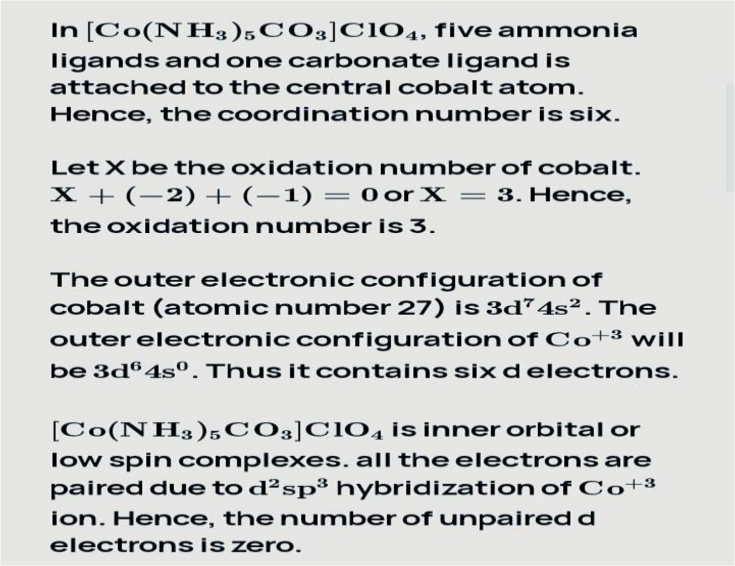
(i) $Zn_{(s)} + 1/2O_{2(g)} \longrightarrow ZnO_{(s)}, \Delta G^\circ = -360 \text{ kJ mol}^{-1}$

(ii) $C_{(s)} + 1/2O_{2(g)} \longrightarrow CO_{(g)}, \Delta G^\circ = -460 \text{ kJ mol}^{-1}$

From reactions it can be seen that, Formation of CO is more thermodynamically favoured at 1000^0C

So, zinc oxide can be reduced by C at this temperature.

64. (a)



In $[Co(NH_3)_5CO_3]ClO_4$, five ammonia ligands and one carbonate ligand is attached to the central cobalt atom. Hence, the coordination number is six.

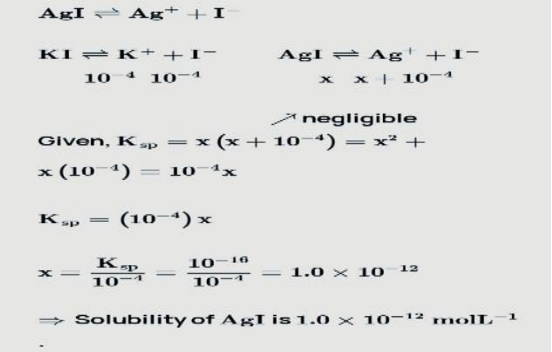
Let X be the oxidation number of cobalt. $X + (-2) + (-1) = 0$ or $X = 3$. Hence, the oxidation number is 3.

The outer electronic configuration of cobalt (atomic number 27) is $3d^7 4s^2$. The outer electronic configuration of Co^{+3} will be $3d^6 4s^0$. Thus it contains six d electrons.

$[Co(NH_3)_5CO_3]ClO_4$ is inner orbital or low spin complexes. all the electrons are paired due to d^2sp^3 hybridization of Co^{+3} ion. Hence, the number of unpaired d electrons is zero.

65. (c)

66. (a)



$AgI \rightleftharpoons Ag^+ + I^-$

$KI \rightleftharpoons K^+ + I^-$ $\quad$ $AgI \rightleftharpoons Ag^+ + I^-$

10^{-4} 10^{-4} $\quad$ x $\quad$ $x + 10^{-4}$

negligible

Given, $K_{sp} = x\,(x + 10^{-4}) = x^2 +$

$x\,(10^{-4}) = 10^{-4}x$

$K_{sp} = (10^{-4})\,x$

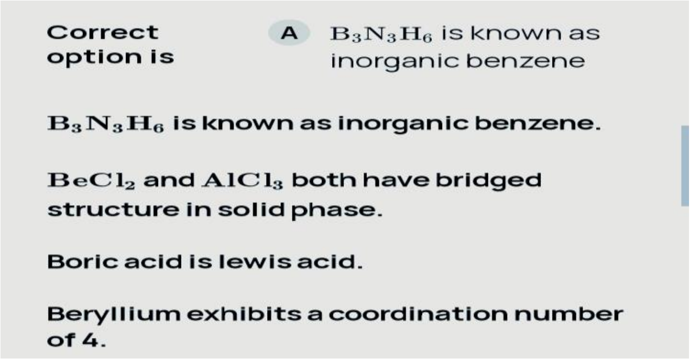
$$x = \frac{K_{sp}}{10^{-4}} = \frac{10^{-16}}{10^{-4}} = 1.0 \times 10^{-12}$$

$\Rightarrow$ Solubility of AgI is $1.0 \times 10^{-12}\ molL^{-1}$

.

67. (a)

68. (a)



Correct option is A $\quad$ $B_3N_3H_6$ is known as inorganic benzene

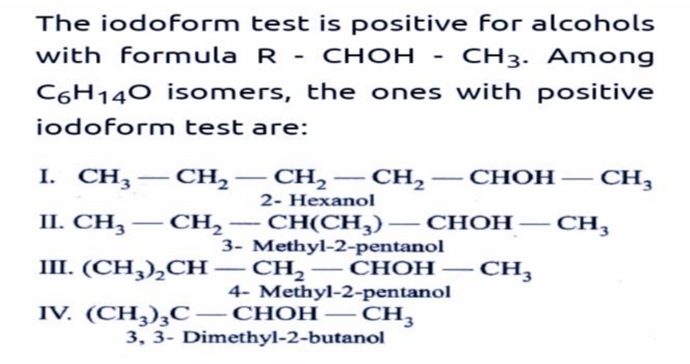
$B_3N_3H_6$ is known as inorganic benzene.

$BeCl_2$ and $AlCl_3$ both have bridged structure in solid phase.

Boric acid is lewis acid.

Beryllium exhibits a coordination number of 4.

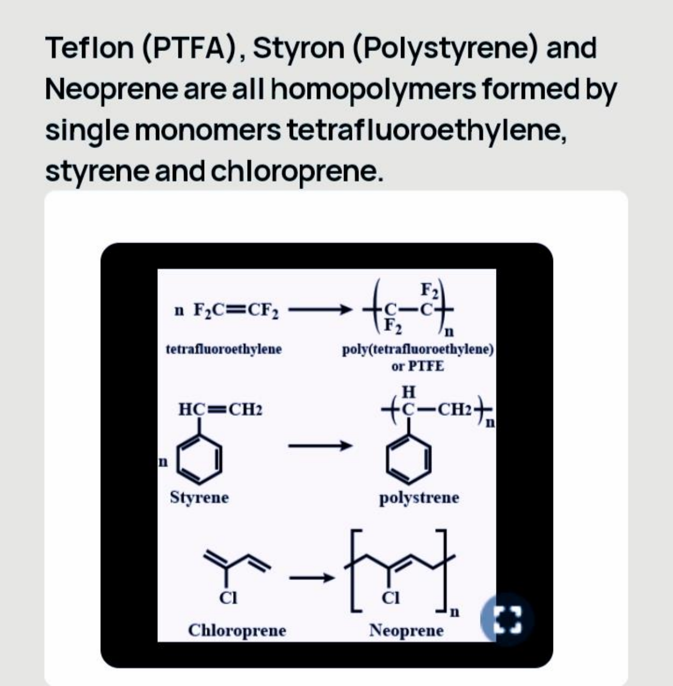
69. (c)



The iodoform test is positive for alcohols with formula R - CHOH - CH_3. Among $C_6H_{14}O$ isomers, the ones with positive iodoform test are:

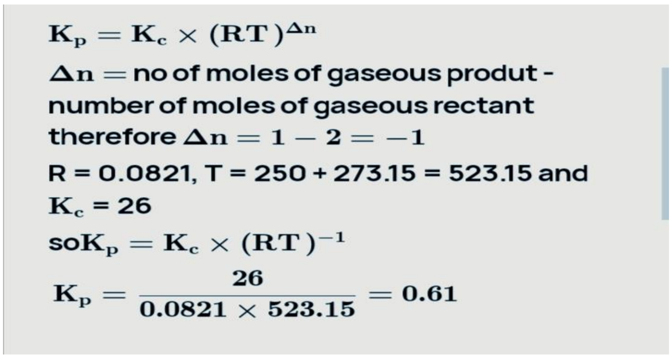
I. $CH_3-CH_2-CH_2-CH_2-CHOH-CH_3$
2- Hexanol
II. $CH_3-CH_2-CH(CH_3)-CHOH-CH_3$
3- Methyl-2-pentanol
III. $(CH_3)_2CH-CH_2-CHOH-CH_3$
4- Methyl-2-pentanol
IV. $(CH_3)_3C-CHOH-CH_3$
3, 3- Dimethyl-2-butanol

70. (c)



Teflon (PTFA), Styron (Polystyrene) and Neoprene are all homopolymers formed by single monomers tetrafluoroethylene, styrene and chloroprene.

71. (a)



$K_p = K_c \times (RT)^{\Delta n}$

Δn = no of moles of gaseous produt - number of moles of gaseous rectant therefore $\Delta n = 1 - 2 = -1$

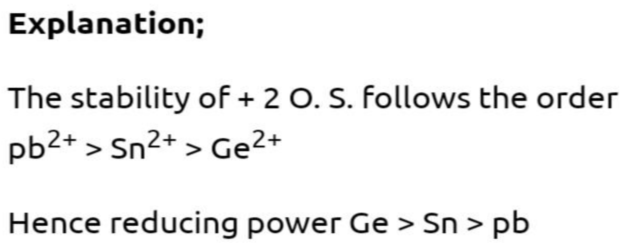
R = 0.0821, T = 250 + 273.15 = 523.15 and K_c = 26

so$K_p = K_c \times (RT)^{-1}$

$$K_p = \frac{26}{0.0821 \times 523.15} = 0.61$$

72. (c)

73.(a)

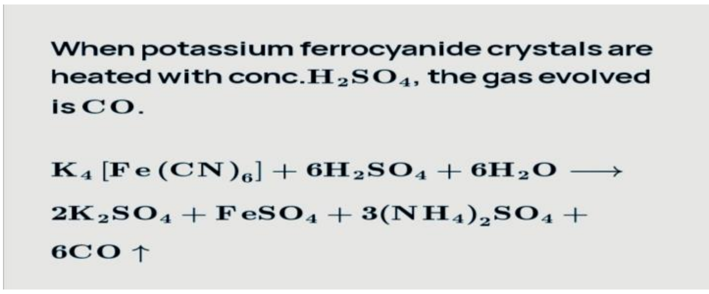


Explanation;

The stability of + 2 O. S. follows the order $pb^{2+} > Sn^{2+} > Ge^{2+}$

Hence reducing power Ge > Sn > pb

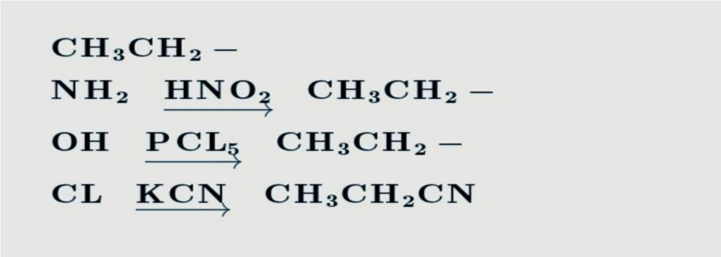
74. (d)



When potassium ferrocyanide crystals are heated with conc.H_2SO_4, the gas evolved is CO.

$$K_4[Fe(CN)_6] + 6H_2SO_4 + 6H_2O \longrightarrow 2K_2SO_4 + FeSO_4 + 3(NH_4)_2SO_4 + 6CO \uparrow$$

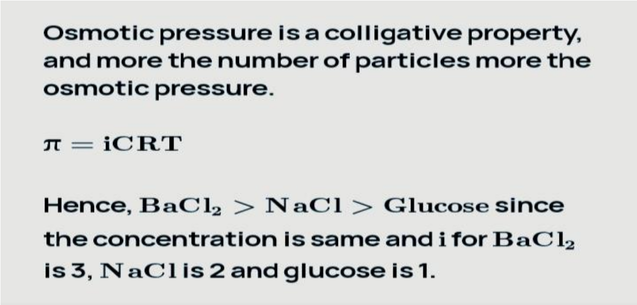
75. (a)



$$CH_3CH_2 - NH_2 \xrightarrow{HNO_2} CH_3CH_2 - OH \xrightarrow{PCL_5} CH_3CH_2 - CL \xrightarrow{KCN} CH_3CH_2CN$$

76.(a)

77. (b)

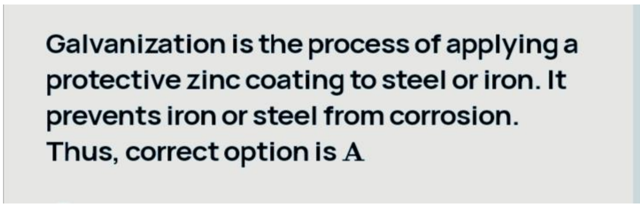


Osmotic pressure is a colligative property, and more the number of particles more the osmotic pressure.

$\pi = iCRT$

Hence, $BaCl_2 > NaCl > Glucose$ since the concentration is same and i for $BaCl_2$ is 3, $NaCl$ is 2 and glucose is 1.

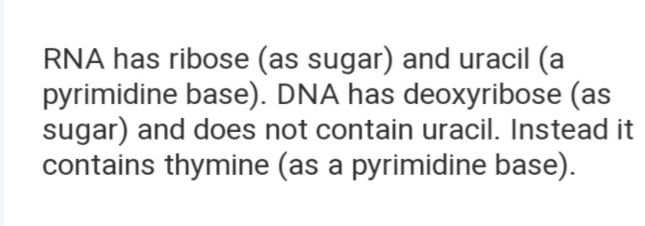
78. (a)



Galvanization is the process of applying a protective zinc coating to steel or iron. It prevents iron or steel from corrosion. Thus, correct option is A

79. (b)

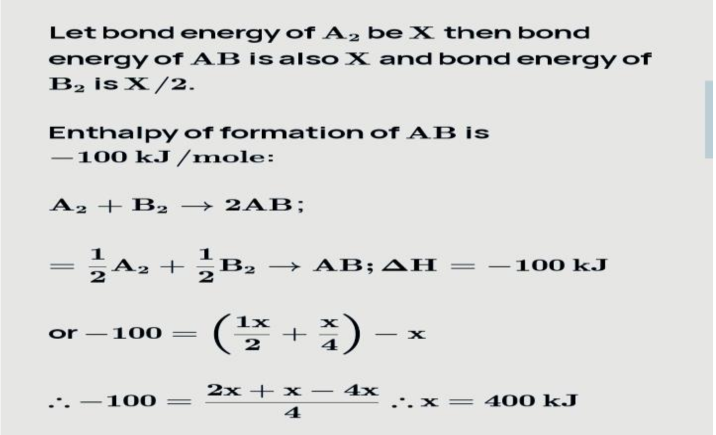
80. (b)



RNA has ribose (as sugar) and uracil (a pyrimidine base). DNA has deoxyribose (as sugar) and does not contain uracil. Instead it contains thymine (as a pyrimidine base).

81. (a)

82. (d)



Let bond energy of A_2 be X then bond energy of AB is also X and bond energy of B_2 is $X/2$.

Enthalpy of formation of AB is $-100\ kJ/mole$:

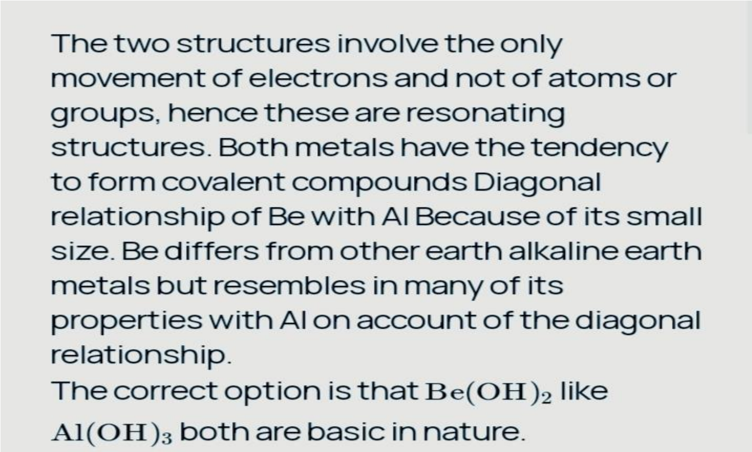
$A_2 + B_2 \longrightarrow 2AB$;

$= \frac{1}{2}A_2 + \frac{1}{2}B_2 \longrightarrow AB; \Delta H = -100\ kJ$

or $-100 = \left(\frac{1x}{2} + \frac{x}{4}\right) - x$

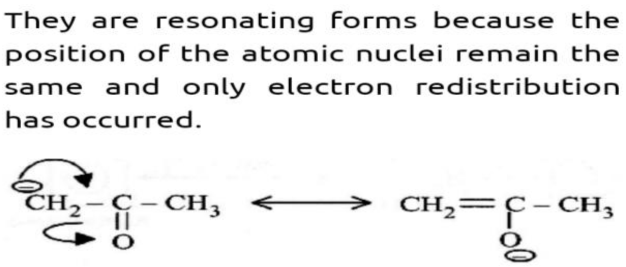
$\therefore -100 = \frac{2x + x - 4x}{4}$ $\therefore x = 400\ kJ$

83. (b)



The two structures involve the only movement of electrons and not of atoms or groups, hence these are resonating structures. Both metals have the tendency to form covalent compounds Diagonal relationship of Be with Al Because of its small size. Be differs from other earth alkaline earth metals but resembles in many of its properties with Al on account of the diagonal relationship.
The correct option is that $Be(OH)_2$ like $Al(OH)_3$ both are basic in nature.

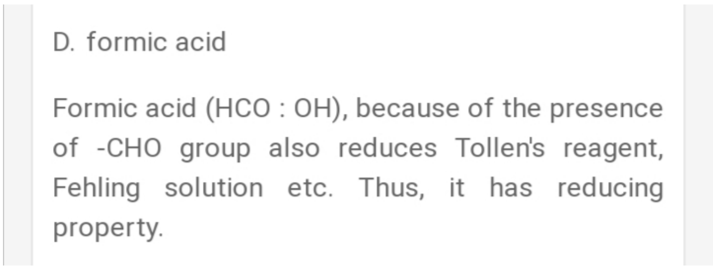
84. (a)



They are resonating forms because the position of the atomic nuclei remain the same and only electron redistribution has occurred.

$\overset{\ominus}{C}H_2-\underset{\underset{O}{||}}{C}-CH_3 \longleftrightarrow CH_2=\underset{\underset{O^{\ominus}}{|}}{C}-CH_3$

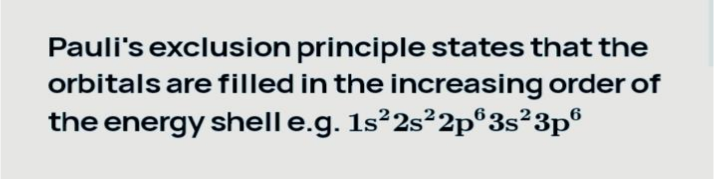
85. (d)



D. formic acid

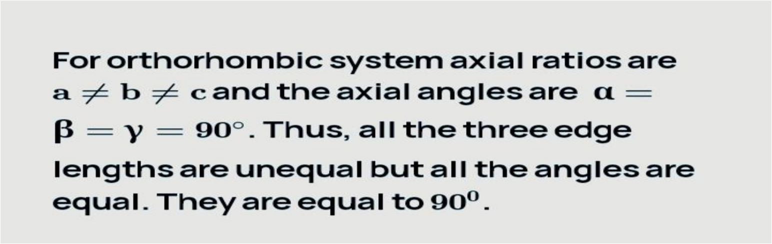
Formic acid (HCO : OH), because of the presence of -CHO group also reduces Tollen's reagent, Fehling solution etc. Thus, it has reducing property.

86. (c)



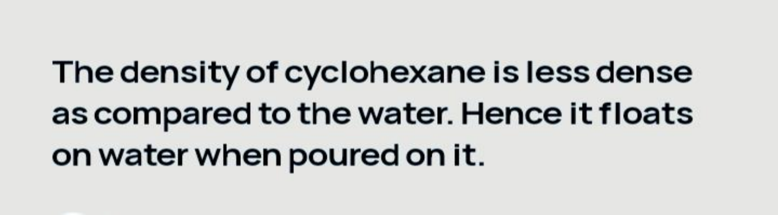
Pauli's exclusion principle states that the orbitals are filled in the increasing order of the energy shell e.g. $1s^2 2s^2 2p^6 3s^2 3p^6$

87. (b)



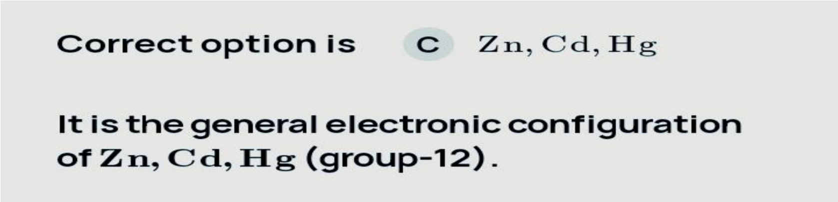
For orthorhombic system axial ratios are $a \neq b \neq c$ and the axial angles are $\alpha = \beta = \gamma = 90°$. Thus, all the three edge lengths are unequal but all the angles are equal. They are equal to 90^0.

88. (d)



The density of cyclohexane is less dense as compared to the water. Hence it floats on water when poured on it.

89. (c)



Correct option is C Zn, Cd, Hg

It is the general electronic configuration of Zn, Cd, Hg (group-12).

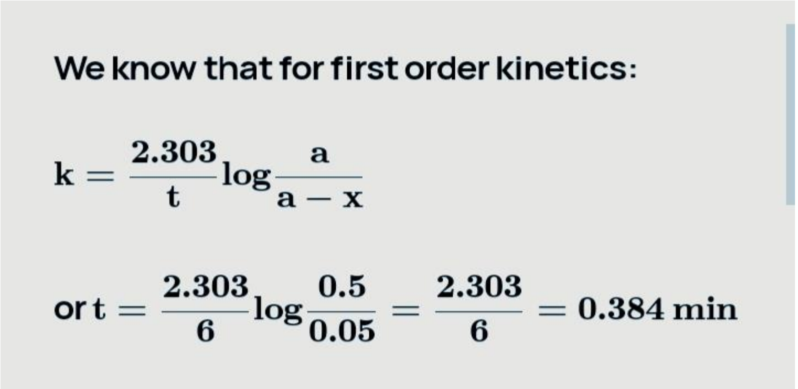
90. (d)

91. (b)

Structurally biodegradable detergent contain normal (or Linear) alkyl chain

92. (c)

93. (a)



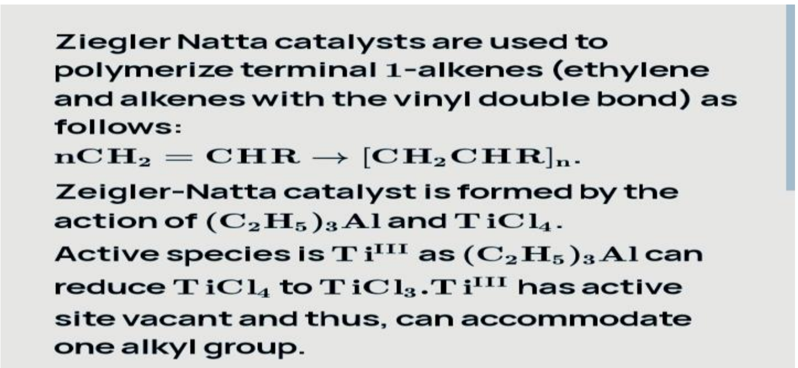
We know that for first order kinetics:

$$k = \frac{2.303}{t}\log\frac{a}{a-x}$$

or $t = \frac{2.303}{6}\log\frac{0.5}{0.05} = \frac{2.303}{6} = 0.384 \text{ min}$

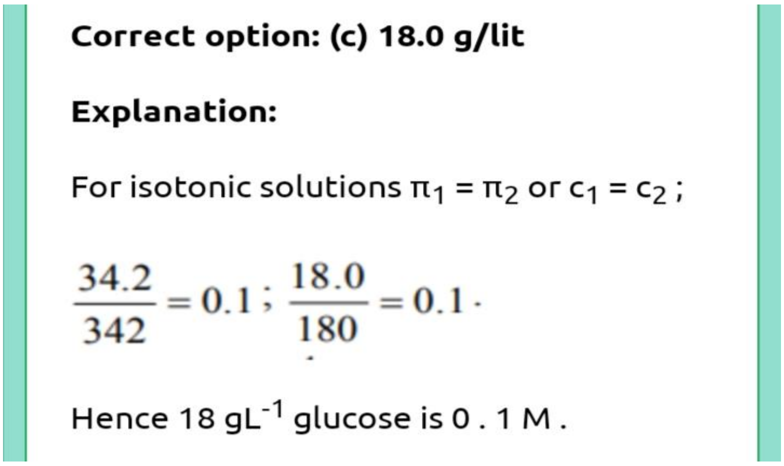
94. (b)

95. (d)



Ziegler Natta catalysts are used to polymerize terminal 1-alkenes (ethylene and alkenes with the vinyl double bond) as follows:
$nCH_2 = CHR \rightarrow [CH_2CHR]_n$.
Zeigler-Natta catalyst is formed by the action of $(C_2H_5)_3Al$ and $TiCl_4$.
Active species is Ti^{III} as $(C_2H_5)_3Al$ can reduce $TiCl_4$ to $TiCl_3$. Ti^{III} has active site vacant and thus, can accommodate one alkyl group.

96. (c)



Correct option: (c) 18.0 g/lit

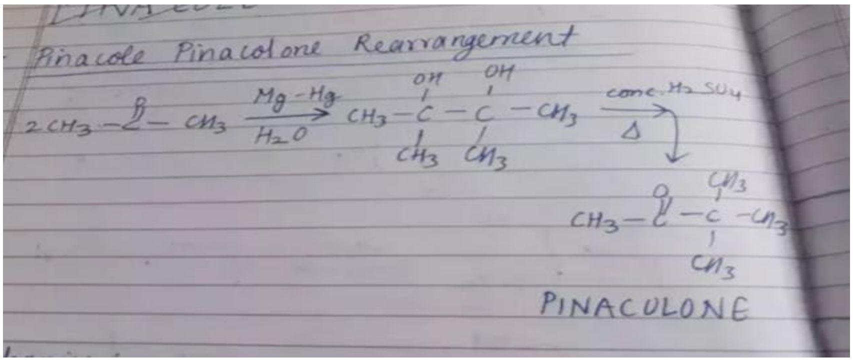
Explanation:

For isotonic solutions $\pi_1 = \pi_2$ or $c_1 = c_2$;

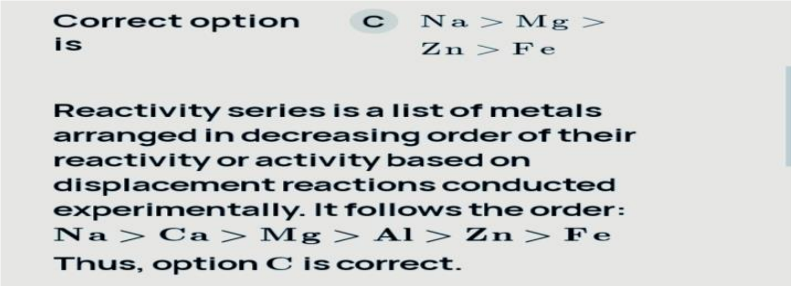
$$\frac{34.2}{342} = 0.1 ; \frac{18.0}{180} = 0.1 \cdot$$

Hence 18 gL^{-1} glucose is 0 . 1 M .

97. (c)



98. (c)



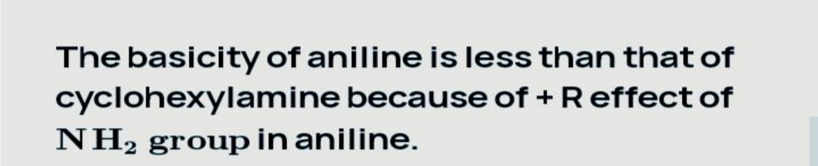
Correct option is **C** $Na > Mg > Zn > Fe$

Reactivity series is a list of metals arranged in decreasing order of their reactivity or activity based on displacement reactions conducted experimentally. It follows the order: $Na > Ca > Mg > Al > Zn > Fe$

Thus, option C is correct.

99. (a)

100. (a)



The basicity of aniline is less than that of cyclohexylamine because of + R effect of NH_2 group in aniline.

SPECTRA
PATH TO SUCCESS

FULL TEST -1

ANSWER KEY -- 720 MARKS

PHYSICS				CHEMISTRY				BOTANY				ZOOLOGY			
Q NO	KEY	Q NO	KEY	Q NO	KEY	Q NO	KEY	Q NO	KEY	Q NO	KEY	Q NO	KEY	Q NO	KEY
1	A	26	D	51	C	76	A	101	C	126	D	151	B	176	C
2	A	27	A	52	C	77	B	102	A	127	D	152	B	177	B
3	C	28	A	53	A	78	A	103	C	128	D	153	D	178	C
4	A	29	D	54	D	79	B	104	C	129	D	154	B	179	A
5	B	30	A	55	A	80	B	105	B	130	B	155	B	180	B
6	B	31	A	56	D	81	A	106	C	131	C	156	B	181	A
7	D	32	A	57	C	82	D	107	D	132	C	157	C	182	C
8	C	33	D	58	A	83	B	108	D	133	B	158	C	183	B
9	A	34	C	59	A	84	A	109	B	134	A	159	D	184	C
10	A	35	C	60	D	85	D	110	B	135	C	160	A	185	A
11	A	36	C	61	A	86	C	111	A	136	D	161	C	186	C
12	D	37	D	62	D	87	B	112	A	137	A	162	A	187	D
13	C	38	B	63	B	88	D	113	B	138	C	163	B	188	A
14	D	39	C	64	A	89	C	114	A	139	B	164	A	189	C
15	D	40	C	65	C	90	D	115	B	140	B	165	D	190	D
16	C	41	D	66	A	91	B	116	B	141	C	166	B	191	C
17	D	42	C	67	A	92	C	117	D	142	B	167	A	192	A
18	C	43	D	68	A	93	A	118	B	143	D	168	C	193	D
19	A	44	A	69	C	94	B	119	C	144	C	169	C	194	A
20	A	45	C	70	C	95	D	120	A	145	B	170	D	195	A
21	D	46	A	71	A	96	C	121	A	146	B	171	C	196	C
22	C	47	C	72	C	97	C	122	A	147	D	172	C	197	B
23	D	48	B	73	A	98	C	123	C	148	D	173	C	198	D
24	B	49	B	74	D	99	A	124	A	149	B	174	D	199	C
25	A	50	A	75	A	100	A	125	D	150	B	175	B	200	D