

Chem Grade 12th model Exam Solutions & Answers

1. D

2. purpose of adding brine (NaCl) in the preparation of soap:

Ans. To form precipitate the molecules out of the solution.

- to the chine form of soap forms fatty acid salts.
- to reduce solubility, the soap leaves the solⁿ a form as solid mass.

3. To find each average mass, the value 2.708 cm³

A. $\frac{2.63 + 2.65 + 2.67}{3} = 2.65$

B. $\frac{2.82 + 2.86 + 2.84}{3} = 2.84$

C. $\frac{2.43 + 2.47 + 2.49}{3} = 2.46$

D. $\frac{2.91 + 2.93 + 2.92}{3} = 2.92$

It can be seen the average mass of ~~choice~~ A is exactly towards the true value.

Therefore choose A is the most accurate.

Others is the least accurate data whose average is 2.46 - far from true value & it is the most precise.

4. $29.154 + 27.156 - 8.1222$

$= 56.29 - 8.1222 = 48.1678 \rightarrow 48.168$

It is five significant digits (from)

5. A

6. D b/c ML value not greater 2 value.

7. D 9. A 1 atm = 0.048 L

8. B

3 atm ? $\lambda = \frac{3 \times 0.048}{1 \text{ atm}} = 0.128 \text{ L}$

10. Soln When two solⁿ of the same solvent are separated by a semipermeable membrane, solvent molecules migrate (move to) through the membrane from the solⁿ of low concⁿ to the solⁿ of high concⁿ.

11. C

14. D

12. C

13. A

15. C, solⁿ $\lambda = \frac{h}{mv} = \frac{6.626 \times 10^{-34}}{0.4 \times 8 \times 25 \text{ m/s}} = 0.6626 \times 10^{-34} = 6.626 \times 10^{-35} \text{ m}$

16. A, solⁿ $\Delta E = 2.18 \times 10^{-18} \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right) = 2.18 \times 10^{-18} \left(\frac{1}{2^2} - \frac{1}{12^2} \right)$

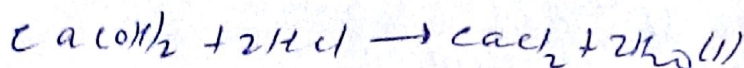
17. B, solⁿ $d = \frac{m}{v}$, $m = 21 = 1.18 \mu \times 100000 \text{ mL} = 1100008 \text{ g}$

Thus, ppm = $\frac{\text{mass of solute}}{\text{mass of solⁿ}} \times 10^6 = \frac{0.228 \times 10^6}{110,0008} = 2 \text{ ppm}$

1 L = 1000 mL
100 L ?

$\lambda = 1000000 \text{ mL}$

18. G. 50/L



2100 mL (0.12)

$$n_{\text{HCl}} = M_{\text{HCl}} \times V(\text{L}) = 0.1 \text{ M} \times 0.1 \text{ L}$$

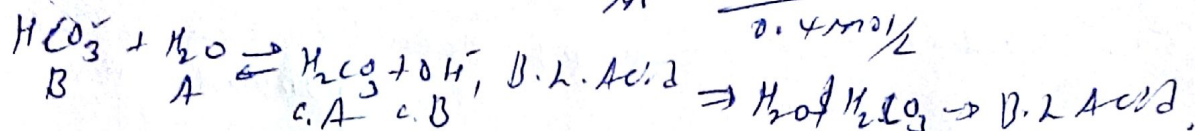
$$\frac{n_{\text{CaCO}_3}}{1 \text{ mol}} = \frac{0.01 \text{ mol HCl}}{2 \text{ mol HCl}}$$

$$= 0.01 \text{ mol of HCl}$$

$$n_{\text{CaCO}_3} = \frac{1 \text{ mol} \times 0.01 \text{ mol HCl}}{2 \text{ mol HCl}} = 0.005 \text{ mol of CaCO}_3$$

19 B.

$$M = \frac{n}{V}, V = \frac{n}{M} = \frac{0.005 \text{ mol}}{0.4 \text{ mol/L}} = 0.0125 \text{ Liter} = 12.5 \text{ mL}$$



20. D. Given $V_1 = 40 \text{ mL}$, $M_1 = 0.1 \text{ M}$, from $\text{pH} = 2$, $M_2 = [\text{H}^+] = 1 \times 10^{-2} \text{ M}$

$$50 \text{ L } M_1 V_1 = M_2 V_2 \Rightarrow V_2 = \frac{M_1 V_1}{M_2} = \frac{40 \text{ mL} \times 0.1 \text{ M}}{0.01 \text{ M}} = 400 \text{ mL}$$

$$V_{\text{H}_2\text{O added}} = V_2 - V_1 = (400 - 40) \text{ mL} = 360 \text{ mL}$$

21. B. N has higher I.E than O, C

22. A. BIC due to the presence of half filled subshell ($2p^3$)

Stability. (NOTICE)

23. D

24. $n=3, l=2$, λ of orbitals subshell = $2l+1 = 2 \times 2 + 1 = 5$

25. B. M.G = E.P.G with out lone pair on the C. Atom.

26. A.

27. C. 50/L $\Delta T_b = K_b m = 0.512^\circ \text{C/m} \times 0.01 \text{ mol} = 0.00512^\circ \text{C}$

$$\text{So that } \Delta T_b = T_b - T_b^\circ \Rightarrow T_b = \Delta T_b + T_b^\circ = 100^\circ \text{C} + 0.00512^\circ \text{C}$$

28. A. 50/L the highest pH value. $= 100.00512^\circ \text{C}$

A. 0.05 M CaCO_3 , $\text{pOH} = 1.3$, $\text{pH} = 14 - 1.3 = 12.7$ ✓ It is the highest value of pH

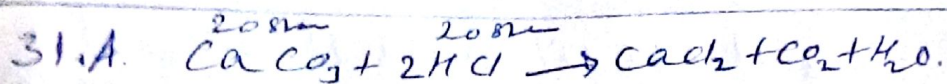
B. 0.05 M HCl , $\text{pH} = 1.09$

C. $0.05 \text{ M H}_2\text{SO}_4$ $\text{pH} = 1.3$ & 0.001 M NaOH $\text{pOH} = 3$, $\text{pH} = 11$

29. B. 50/L $\Delta H < 0$, $\Delta S > 0$, $\Delta G < 0$, then the rxn is spontaneous process.

$\Delta H > 0$, $\Delta S < 0$, $\Delta H > 0$, $\rightarrow$ non-spontaneous process.

30. C. Note: The small pK_a value has strong Acid.
The large pK_a value has weak Acid.
The small pK_b value has strong base.

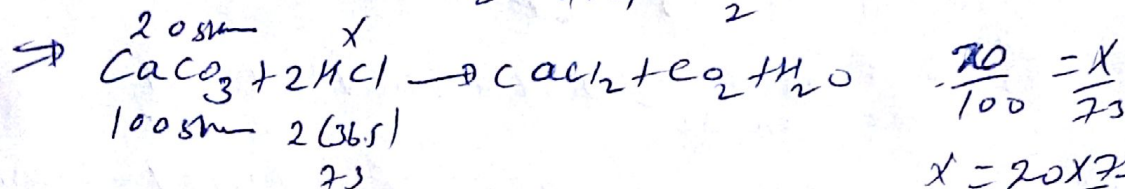


→ 1st To determine the no of mole, then divided to its coefficient used to identify limiting or excess.

Mole of $\text{CaCO}_3 = \frac{208}{1008/101} = 0.2 = 0.2$ - limiting

Mole of $\text{HCl} = \frac{208\text{g}}{3658/101} = 0.55 = 0.274$ - excess.

$\text{CaCO}_3 = 100\text{g}$
 $\text{HCl} = 36.5\text{g}$

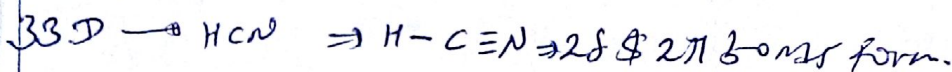


$x = \frac{20 \times 73}{100} = 14.6\text{g}$

So that, excess mass of HCl (or left unreacted of HCl) = original mass of HCl - reacted mass of HCl

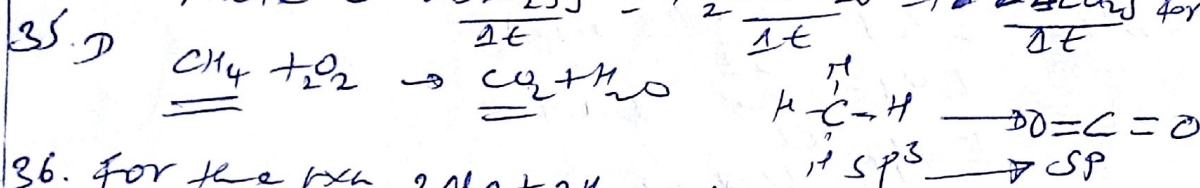
$= 208 - 14.6\text{g} = 5.4\text{g}$ left unreacted.

32. A.



34. C, rate = -ve reactant & positive product side.

rate = $-\frac{\Delta[\text{N}_2\text{O}]}{\Delta t} = +\frac{1}{2}\frac{\Delta[\text{N}_2]}{\Delta t} = +\frac{2}{3}\frac{\Delta[\text{O}_2]}{\Delta t}$ for $\text{N}_2\text{O} \rightarrow 2\text{N}_2 + \frac{1}{2}\text{O}_2$



36. for the rxn $2\text{NO} + 2\text{H}_2 \rightarrow \text{N}_2 + 2\text{H}_2\text{O}$

B. find the value of x by using EXP. + 1 & 2 respect to y, rate = $k[\text{A}]^x[\text{B}]^y$

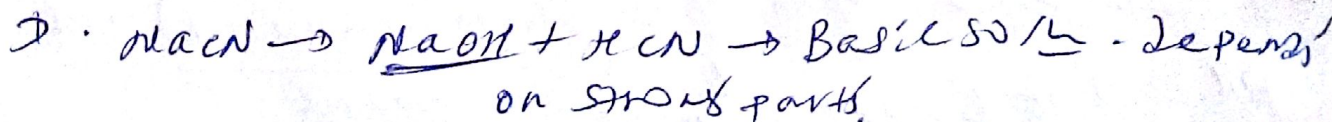
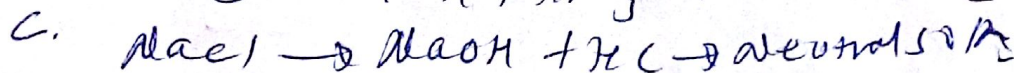
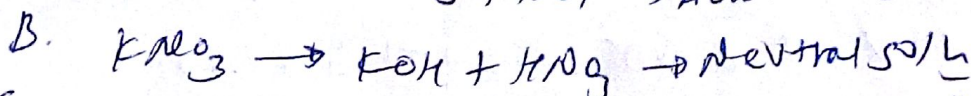
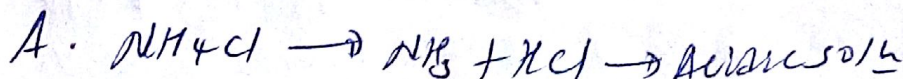
$\frac{\text{rate}_3}{\text{rate}_1} = \frac{k[\text{O}_2]^x[\text{O}_2]^y}{(0.2)^x(0.1)^y} \Rightarrow \frac{4.92 \times 10^{-3}}{1.23 \times 10^{-3}} = \left(\frac{0.2}{0.1}\right)^x$ $4 = 2^x$

To find the value of y by using EXP. + 1 & 2 respect to x, $2^2 = 2^x, x=2$

$\frac{\text{rate}_2}{\text{rate}_1} = \frac{k[\text{O}_2]^x[\text{O}_2]^y}{(0.1)^x(0.2)^y} = \frac{2.46 \times 10^{-3}}{1.23 \times 10^{-3}}$ $2^y = 2, y=1$

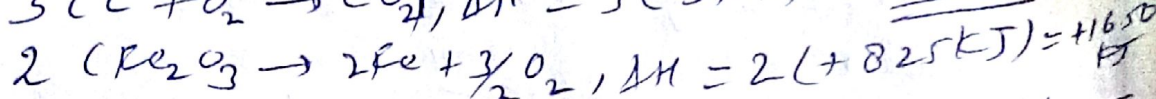
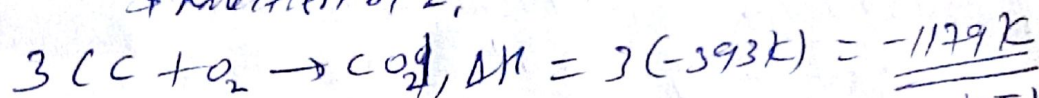
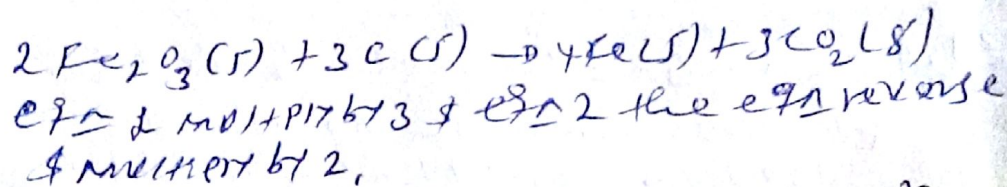
Rate = $k[\text{NO}]^2[\text{H}_2]$

37. D



M. ch
1/1

38. B. 50M



$$\text{so, } \Delta H = \Delta H_1 + \Delta H_2 = (-1179 + 1650)\text{KJ} = +471\text{KJ}$$

39. $E^\circ_{\text{cell}} = E^\circ_{\text{red}} - E^\circ_{\text{ox}} = 0.34 - (-1.6\text{V}) = 1.94\text{V}$

$$\Delta G^\circ = -nFE^\circ_{\text{cell}} = -6\text{mol of e}^- \times 96500\text{C/mol} \times 1.94\text{V} = -1123260\text{J}$$

$$= -1.1233 \times 10^6\text{J}$$

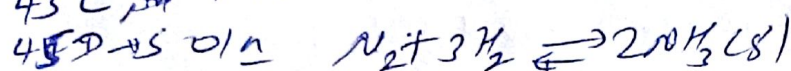
$$= -1123\text{KJ}$$

40. C

41. A

42. B

43. C, 44. D



At equilibrium $[\text{N}_2] = \frac{1\text{mol}}{2\text{L}} = 0.5\text{M}$

$$[\text{H}_2] = \frac{2\text{mol}}{2\text{L}} = 1\text{M}$$

$$[\text{NH}_3] = \frac{3\text{mol}}{2\text{L}} = 1.5\text{M}$$

$$K_c = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3} = \frac{(1.5)^2}{(0.5)(1)^3} = \frac{2.25}{0.5} = 4.5\text{L}^2\text{mol}^{-2}$$

46. B For 1st order rxn $t_{1/2}$ is constant.

For 2nd order rxn $t_{1/2}$ is decrease with $\uparrow [\text{A}]_0$

For 2nd order rxn $t_{1/2}$ increase w decrease $[\text{A}]_0$.

Since Rate $= k[\text{A}]^2$

$[\text{A}]_0$	2M	1M	0.5M	0.2M
Rate	4	1	0.25	0.04

47. A $\Delta n < 0$ $\frac{-\Delta G}{\Delta n} = \Delta H - T\Delta S$ } $\Delta H > 0$, $\Delta S < 0$, $\Delta n = n_p - n_r$ } ΔH & ΔS not use.

48. C $\Delta E = \Delta H + \Delta W = 8.6\text{J} + (-2.7\text{J}) = +5.9\text{J}$

49. B. 50M $[\text{H}^+] = \frac{V_A C_A - V_B C_B}{V_A + V_B} = \frac{(60 \times 0.1 - 40 \times 0.1)\text{M mL}}{200\text{mL}} = 0.02\text{M}$

$\text{pH} = -\log [0.02] = 1.7$

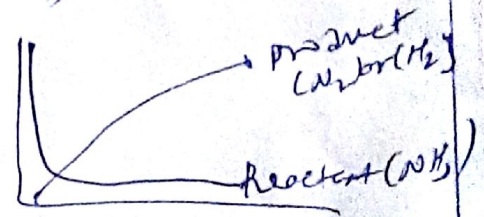
50. C

51. D

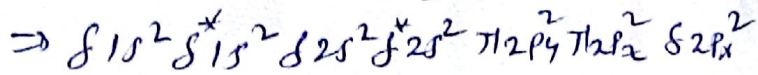
52. A

53. D sp^2 $F = C - Pt + 2 \Rightarrow$ for propene water
 $F = 2 - 1 + 1 = 2$ or $F = 1 - 1 + 2 = 2 //$

54. P for rxns $2NH_3 \rightarrow N_2 + 3H_2$



55. A, $N_2 \Rightarrow$ Total v.e. = $2 \times 7 = 14$



$$B.O.R = \frac{1}{2} (N_b - N_a) = \frac{1}{2} (10 - 4) = \frac{6}{2} = 3 //$$

56. C

57. A sp^2 base $BH_3 \rightarrow BH^+ + OH^-$

$$\% \text{ Ionization} = \frac{\text{ionized conc.}}{\text{initial conc.}} \times 100 \Rightarrow 2.5\% = \frac{[OH^-] \times 100}{0.04M}$$

$$pOH = -\log [0.001M] = 3$$

$$\frac{100 [OH^-]}{100} = \frac{2.5 \times 0.04}{100}$$
$$[OH^-] = 0.001M$$

$$so, pH = 14 - 3 = 11$$

58. B note $\rightarrow$ more no of ion produce, the low f.p point form.

- A. $0.2M NaCl \rightarrow Na^+ + Cl^- = 2 \text{ mol of ion produced}$
- B. $0.2M FeCl_3 \rightarrow Fe^{3+} + 3Cl^- = 1 + 3 = 4 \text{ mol of ion produced}$
- C. $0.2M$ sucrose not ion formed.
- D. $0.2M CaCl_2 \rightarrow Ca^{2+} + 2Cl^- = 1 + 2 = 3 \text{ mol of ion produced}$

59. C, anion electroplate Silver cathode Copper anode

60. C. Note the gas will diffuse faster, the molar mass is small to compare. the given gas.
The molar mass of gas equal mass, they are equal rate diffused.

62. D

63. B.

64. A.

65. C. DSO N $\Delta H_f = \Delta H_{sub} + \Delta H_{fus} + \Delta H_{melt} + \Delta H_{boil} + \Delta H_{vap}$

$$-590 = \Delta H_{sub} + \frac{158}{2} + 520 + (-328) + (-1016)$$
$$\Delta H_{sub} = -590 + 79 + 520 - 1344$$
$$= -590 + 745$$
$$= +155KJ \Rightarrow +155KJ //$$

66. A.
67. B.
68. C.
69. D.
70. A.
71. B.

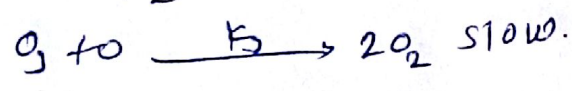
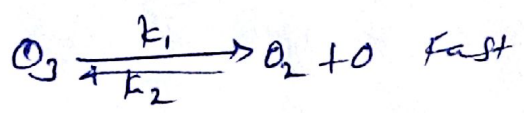
72. D $\rightarrow$ $\text{NH}_3 \rightarrow$ Haber process. (not Hall process).

73. C Example $\text{CH}_3\text{CH}_2\text{C}(=\text{O})\text{CH}_2\text{CH}_3 \xrightarrow{\text{LiAlH}_4}$

$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{CH}_3\text{CH}_2\text{OH}$
propanol ethanol
two kind of Alcohols are formed.

74. A.
75. B

SOLN



rate = $k_3 [\text{O}_3] [\text{O}]$ eliminate $[\text{O}]$ by using 1st step
b/c it is an intermediate.

$k_f = k_r$ (rate of forward = rate of reverse),

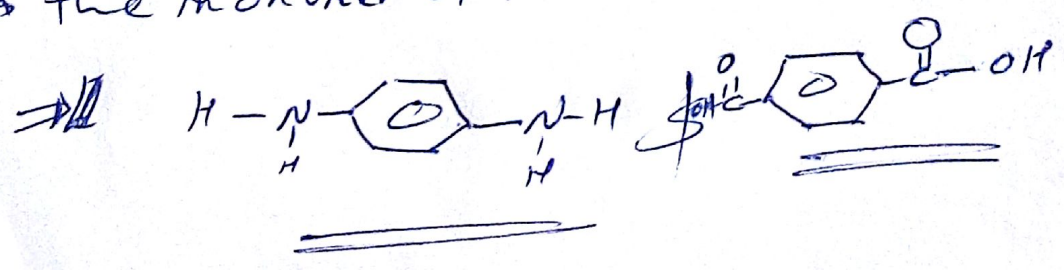
$$k_1 [\text{O}_3] = k_2 [\text{O}_2] [\text{O}]$$

$[\text{O}] = \frac{k_1 [\text{O}_3]}{k_2 [\text{O}_2]}$ replace this value the rate law expression.

$$\text{rate} = \frac{k_3 k_1 [\text{O}_3] [\text{O}]}{k_2 [\text{O}_2]} = \frac{k [\text{O}_3]^2 [\text{O}_2]^{-1}}{[\text{O}_2]}$$

76. D,
77. A.
78. B.
79. C.
80. D

$\rightarrow$ the monomer of kevlar structure is an.



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