Date :...../...../.....

1)

a)

i) $BaCO_{3(s)} + 2H^+_{(aq)} \rightarrow Ba^{2+}_{(aq)} + H_2O_{(l)} + CO_{2(g)}$

ii) Effervescence of colorless gas produced which turns limewater milky. Solid (white) $BaCO_3$ dissolves in HCl.

b)

i) Mole = Vol x Conc = $\frac{25}{1000} \times 2 = 0.05$ mol

ii) Mole of $BaCO_3$ = $0.05/2 = 0.025$ mol

Mass = Mole x M_r = ~~$0.025 \times (137 + 12 \times (3 \times 16))$~~

= ~~4.925 g~~

$= 0.025 \times 197.3$

$= 4.9325$ g

ii) To ensure all acid reacted

iv) Filter the solution, collect $BaCl_2(aq)$ as filtrate.

v)

1.03) 3.09, 1.033125, 3.089

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1 3

vi) Some crystals might have been left on filter paper while filtering.

2)

a)

i) Mass → N, H, S, O

) 14.92, 3.09, 33.06, 49.43

Mol = 1.03, 3.09, 1.033, 3.089

Ratio = 1 : 3 : 1 : 3

For = NH_3SO_3 = H_3NSO_3

ii) $x = \frac{97.1}{97.1} = 1$

∴ M.F = ~~NH_3SO_3~~ H_3NSO_3

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$3Mg + 2H_3NSO_3 \rightarrow Mg_3(NSO_3)_2 + 3H_2$

$3CO_3^{2-} + 3H^+ \rightarrow CO_2 + H_2O$ $\quad$ $3CaCO_3 + 2H_3NSO_3 \rightarrow Ca_3(NSO_3)_2 + CO_2 + 3H_2O$

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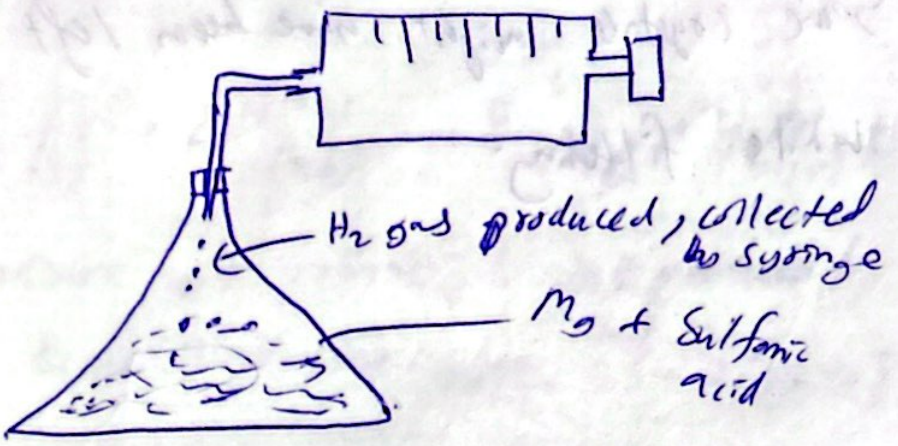
b) i)



ii) $\text{Moles} = \frac{5.5 \times 10^{-3}}{2} \times 3 = 8.25 \times 10^{-4}$ mol

iii)

c) i) $CO_3^{2-} + 2H^+ \rightarrow H_2O + CO_2$

ii) Has higher pH, dissassociates less than HCl.

3) a) i) $\text{Moles} = \text{Vol}/24000 = 58.4/24000 = 0.0024$ mol

ii) $\text{mass} = \text{mole} \times M_r = 0.0024 \times 84 = 0.2094$ g

iii) $\frac{0.2094}{0.227} \times 100 = 90.04\%$

$\approx 90\%$

b) i) 90.66% = 89.43% — 90.66%

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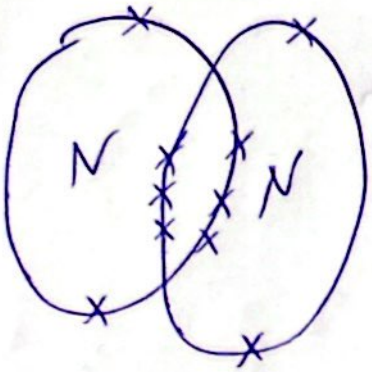
ii) It may dissolve in water, may be denser than water.

4)

a) i)



ii) Mole x A_r

$= \frac{\text{mass}}{A_r} \times A_r \times 2$

$= \frac{5.6}{14 \times 2} \times 6.02 \times 10^{23} \times 2$

$= 2.41 \times 10^{23}$

iii) $pV = nRT$

$\Rightarrow 1.36 \times 10^5 \times \frac{108}{1000} = n \times 8.31 \times 25$

$\Rightarrow n = 70.7$

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5) a) i) $(NH_4)_2Cr_2O_7 \rightarrow Cr_2O_3 + N_2 + 4H_2O$

ii) Thermal decomposition

b)