① $\rho = \frac{M}{V}$

$V = 39.5 - 30.0 = 8.5$

$\frac{48.40}{8.5} = 5.694 g/ML$

② Volume = 25.0ml

Mass : $111.5 - 74.85 = 36.65g$

$\rho = \frac{M}{V} = \frac{36.65}{25} = 1.466 g/cm^3$

③ Molar mass of $CaF_2 = 78$

$\text{Moles} = \frac{75}{78} = 0.961 \text{Moles}$

④ 1mole at stp $= 22.4 dm^3$

1mole $= 22.4 \times 42$

$\frac{42 \times 1}{22.4} = 1.875 \text{moles}$

5 moles of $Fe_2O_3 = \frac{3}{159.69} = 0.0188 moles$

Mole Ratio $Fe_2O_3 : Fe(CrO_2)_2$

2 : 4

0.0188

$Moles = \frac{0.0188 \times 4}{2} = \underline{\underline{0.0376}}$

6 moles of K_2CrO_4

$\frac{4}{194.1896} = 0.0206 moles$

Moles of $Fe(CrO_2)_2 = \frac{0.0206 \times 4}{8}$

$= 0.0103 moles$

$Mass = 0.0103 \times 223.83 =$

$= \underline{2.3059g}$

7. moles of $Fe(CrO_2)_2$

$$\frac{10}{223.83} = 0.0447 \text{ moles}$$

Ratio:

$Fe_2O_3 : Fe(CrO_2)_2$

2 : 4

0.0447

moles of $Fe_2O_3 = \frac{0.0447 \times 2}{4}$

$= 0.0223$ moles

Mass $= 0.0223 \times 159.69 = 3.5672\,g$

$$\text{Yield} = \frac{2.90}{3.5672} \times 100 = 81.296\%$$

$= 81.296\%$

Moles of $Fe(CrO_2)_2$

8) $\frac{100}{223.83} = 0.447$ Moles

Moles $K_2CO_3 = \frac{50}{138} = 0.3623$ moles

Ratio of $Fe(CrO_2) : K_2CO_3$

1 : 2

hence the limiting Reactant is K_2CO_3 since it used up Completly.

9). N = SP^3

O = SP^2 hybridised.

10.) Dilution

$M_1V_1 = M_2V_2$

$5 \times V = 0.3 \times 160$

$V_1 = \frac{0.3 \times 160}{5}$

$V = 9.6$ ml