Daily Tutorial Sheet-14	Level - 3

153.(B) Oleum $\Rightarrow [H_2SO_4 + SO_3]$

Reaction involved

$$[H_2SO_4 + SO_3] + H_2O \longrightarrow H_2SO_4 + H_2SO_4$$
$$\longleftarrow 100g \longrightarrow \qquad\qquad (100 - w)$$
$$(100 - w)g \quad wg$$

If w = 100g, moles of $SO_3 = \frac{100}{80} = 1.25$ mole

moles of H_2O required to react with 1.25 moles of $SO_3 = 1.25$ mole mass added = $(1.25 \times 18)g = 22.5\,g$.

It means if we would have 100 g of SO_3 then, mass of H_2SO_4 obtained would be 122.5 g thus maximum percentage yield of on oleum sample should be just less than 122.5%.

154.(A) 0.0833 moles of compound $\rightarrow$ 1 mole of hydrogen

1 mole of compound $\rightarrow \frac{1}{0.0833}$ moles of hydrogen $\rightarrow 12$ moles of H

$CH_2O \rightarrow$ Empirical formula.

Molecular formula $= C_6H_{12}O_6$

155.(C) $C_nH_{2n} + H_2 \longrightarrow C_nH_{2n+2}$

$$\% \text{ raise} = \frac{2}{12n + 2c}100$$

$$2.38 = 100 \times \frac{1}{7n}$$

n = 6.

156.(A) $W_C : W_H = 8 : 1$

$n_C : n_H = 8 : 12 = 2 : 3$

	Mass	Moles	Simplest Ratio
C	$92.7\frac{8}{9} = 82.4$	$\frac{82.4}{12} = 6.86$	$15.04 = 30$.
H	$\frac{92.7}{9} = 10.3$	$10.3 = 10.3$	$22.58 = 45$.
O	7.3	$\frac{7.3}{16} = 0.456$	1 = 2

Empirical formula $= C_{30}H_{45}O_2$

157.(C) $Mn_XO_Y + \frac{Y}{2}C \longrightarrow XMn + \frac{Y}{2}CO_2$

$$n_{Mn_XO_Y} = \frac{31.6}{55x + 16y} \qquad n_{CO_2} = \frac{13.2}{44} = 0.3$$

$$\frac{Y}{2} n_{Mn_XO_Y} = n_{CO_2}$$

$$\frac{Y}{2} \frac{(31.6)}{(55x + 16y)} = 0.3$$

$$\frac{Y}{x} = \frac{3}{2} \quad \Rightarrow \quad Mn_2O_3$$

158.(A) In A, uranium contains the same exact ratio required.