**ANSWER KEY**

**Question One:**

114 mm$^3$

**Question Two:**

**a)** The species $^{120}Sn^{2+}$ contains the following:

number of protons = 50,   number of electrons = 48, and

number of neutrons = 70 in one ion.

**b)** $^{80}_{34}Sc^{2-}$

**c) i)** 28.09 amu

  **ii)** Si - silicon

**Question Three:**

**a)**     i) $Li_2O$ ii) $Al(OH)_3$

iii) $Mg(ClO_3)_2$ iv) HCN

v) $Pb(SO_4)_2$

**b)**     Give the proper (IUPAC) names for each of the following compounds.

i) calcium carbide ii) Iron(II) phosphate

iii) nitrous acid iv) tetraphosphorous hexoxide

v) copper(II) acetate

**Question Four:**

  **a)**    $C_4H_9OH(g) + 6 O_2(g) \longrightarrow 4 CO_2(g) + 5 H_2O(g)$

  **b)**    $3 Ca^{2+}(aq) + 2 PO^{3-}_4(aq) \longrightarrow Ca_3(PO_4)_2(s)$

**Question Five:**

  a) The **empirical formula** of eugenol is $C_5H_6O$.

  b) The **molecular formula** of eugenol is $C_{10}H_{12}O_2$.

**Question Six:**

  **a)** $O_2$ is limiting.  The theoretical yield of NO (in grams) is 112.5g

  **b)** The mass of the excess reactant $NH_3$ left over is 36.14g

  **c)** The percent yield of NO is 88.89%

**Question Seven:**

   The % Purity of $CaCO_3$ sample is 87.02 %

**Question Eight:**

  **a)** 27.3 mL of 0.275 *M* HI solution.

  **b)** 24.3g of KCl

**Question Nine:**   (**15 MARKS**)

  **a)** The final volume of the balloon is $5.10 \times 10^3$ L.

  **b)** The molecular weight (molar mass) of the unknown gas is 40.0 g/mol.

  **c)** The volume of $CO_2(g)$ produced is 4.73 L.

**BONUS  (4 MARKS)**

The atomic mass is 51.9 g/mol, therefore, element "X" is Cr (chromium).