TERM TWO 2017FORM 3 CHEMISTRY

PP1 MARKING SCHEME

1. Deflagrating spoon – used for holding solid substances during burning.
2. Add excess copper to nitric (IV) acid and filter the mixture. Add excess Na_2CO_3 solution to the filtrate and filter to obtain the residue of copper (ii) carbonate.
3.
     a. Lead (ii) sulphate / $PBSO_{4(s)}$
     b. $PB^{2+} + SO_4^{2-} \Longrightarrow PBSO_{4(s)}$
4.
     a. Deliquescence
     b. Defrosting of roads in very cold climates
5.
     a. Under the same conditions of temperature and pressure, the rate of diffusion of a gas is inversely proportional to the square root of its density.
     b. $\dfrac{TSO_2}{TC0_2} = \sqrt{\dfrac{MSO_2}{MCO_2}} = \sqrt{\dfrac{64}{44}} = \dfrac{1.4545}{1}$ OR $\dfrac{TSO_2}{TC0_2}$

     $SO_2 = 32 + 32 = 64$ $TSO_2 = \dfrac{1.4545 \text{ X } 30}{1}$

     $CO_2 = 12 + 32 = 44$

     $= 43.6363$ seconds

6. Oxidizing agent – SO_2 – Sulphur (iv) oxide

   Reducing agent – H_2S – Hydrogen sulphate

7.
     a. Metallic bond
     b. Group I has one electron in its outermost occupied energy level.
8.
     a. Minimum energy required to remove completely an electron from the outermost energy level of an atom in gaseous state.
     b. F- It is less electro positive. It requires more energy to lose electrons.
9. Mass of $CH_3COO4 = 25$ X $1.05 = 26.25$
   Mass per liter $= 26.25$ x $2 = 52.5$
   Molar mass of CH3COO4 $= 60$
   Molarity $= \dfrac{52.5}{60} = 0.875$ mole/dm3

                    Or

   Mass of $CH_3COO4 = 25$ X $1.05 = 26.25$
   Molar mass $= 60$
   Therefore: No of moles $= \dfrac{26.25}{60} = 0.4375$
   Molarity $= \dfrac{(0.4375 \text{ x } 1000)}{500} = 0.875$ molars $/_{dm^3}$

10. $6.016 \times 7.016 (100 - x) = 6.939 \times 100$
    $6.015 + 701.6 - 7.016x = 693.9$
    $- 1.001x = -7.9$
    $X = 7.892$
    Most abundant isotope $= 100 - 7.892 = 92.108\%$

11.
    a. Used for drying or keeping substances free from moisture
    b. Used for supporting crucible during heating.

12.
    a. Silicon (iv) oxide has a giant atomic structure with strong covalent bond. Between carbon (iv) oxide molecules are weak van der Waals forces which breaks at room temperature.
    b. Used in the extraction of less reactive metals e.g. iron.

13.
    a. Is a group of compounds with similar chemical properties, chemical formulae and exhibit gradual change in physical properties.
    b. Pentane

        2- Methylbotane

        2,2- dimethlylptopane

14. Heat the mixture and collect the sublimate of Fecl3 on a watch glass. Add water to the remaining mixture and stir to dissolve KCL, filter to obtain ZnO as a residue and KCl as a filtrate, evaporate the filtrate to obtain KCL crystals.

15.
    a. Hexane
    b. 2 – methyl propane

16.
    a. Charred black mass of carbon. $H_2SO_{4(l)}$ removes elements of water from sugar leaving carbon.
    b. $C_{(s)} + 2H_2SO_{4\ (l)} = 2SO_{2(g)} + CO_{2(g)} + 2H_2O_{\ (l)}$

17.
    a. $2PB\ (NO_3)_{2\ (s)}$ $\xrightarrow{\text{heat}}$ $2PBO_{(s)} + 4NO_{2(g)} + O_{2(g)}$

    b. No of moles $2NO_2$ $= \dfrac{0.58}{24}$ $=0.0242$

        No of moles PB $(NO_3)_2 = 0.02417 \times \frac{1}{2}$
        $= 0.01208$
        Mass of PB $(NO_3)_2 = 207 + (14 +48)_2$
        $= 331$
        Mass of PB $(NO_3)_2 = 0.01208 \times 331$

$$= 3.99848$$
$$= 4.0g$$

18.
   (i)   B
   (ii)   2- It hydrolysis in water to produce $H^+_{(aq)}$

19.
   a. Existence of an element in more than one form in the same physical state
   b. (I) Graphite
       (ii)   High melting point and high boiling point

20. Mass of carbon $= \dfrac{12}{44}$ x 5.94 = 1.62

   Mass of hydrogen $= \dfrac{2}{18}$ x 2.43 = 0.27

   Total mass = (1.62 + 0.27) = 1.89

      0.0675 moles of CH = 1.89

   Therefore 1 mole (RFM) = $\dfrac{1.89}{0.0675}$ = 28

Element	C	H
Mass in gm	1.62	0.27
R.A.M	12	1
Moles	$\dfrac{1.62}{12}$ = 0.135	$\dfrac{0.27}{1}$ = 0.27
Mole ratio	1:2	

   $(CH_2)_n$ = 28   therefore   MF – C_2H_4

   N=2

21. $\dfrac{P_1V_1}{T_1}$ $= \dfrac{P_2V_2}{T_2}$

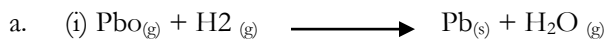 $\dfrac{152 \times 6}{250}$ $= \dfrac{P_2 \times 3}{500}$

   $P_2 = \dfrac{152 \times 6 \times 500}{250 \times 3}$

   $P_2 = 608\ H_g$

22.
   a. Bromine – its melting point is lower than room temperature while its boiling point is above room temperature.
   b. Because of stronger intermolecular forces of attraction as it increases with increases in size of molecules, iodine molecules are bigger.
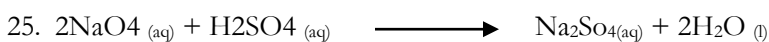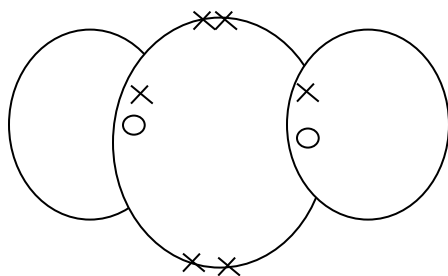
23.
   a.   (i) $Pbo_{(g)} + H2_{(g)} \longrightarrow Pb_{(s)} + H_2O_{(g)}$

$$2H_{2(g)} + O_{2(g)} \qquad\qquad 2H_2O_{(g)}$$

(ii) $CaCl_2$ / CaO

24.

25. $2NaO4_{(aq)} + H2SO4_{(aq)} \longrightarrow Na_2So_{4(aq)} + 2H_2O_{(l)}$

Molarity $= \dfrac{g/ \text{liters}}{Mm} = \dfrac{8}{40}$ 0.2m

Moles of $NaO_4 = \dfrac{0.2 \times 25}{1000} = 0.005$ moles

Moles of Naso4 $= \dfrac{0.005}{2} = 0.0025$

Hence molarity $= \dfrac{0.0025}{10} \times 1000$
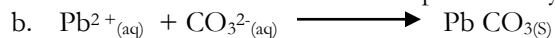
$= 0.25$ moles / litre

26. A   deliquescent   substance is one which absorbs two much water fro0m the
   H H atmosphere to form a solution.
           O

   Efflorescent   substances are one which loses its water of crystallization to air without heating.

27.
   a. This is a solution which has a replaceable hydrogen ions
   b. $Pb^{2+}_{(aq)} + CO_3^{2-}_{(aq)} \longrightarrow Pb\ CO_{3(S)}$

28.
   a. Liquid
   b. Through repeated compression (200 atoms) and expansion of air which cools it to liquid at – 200^0c
   c. Argon