

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 Na₂CO₃ solution to the filtrate and filter to obtain the residue of copper (ii) carbonate.
3.
 - a. Lead (ii) sulphate / PbSO_{4(s)}
 - b. $Pb^{2+} + SO_4^{2-} \rightleftharpoons PbSO_{4(s)}$
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. $\frac{r_{SO_2}}{r_{CO_2}} = \sqrt{\frac{M_{SO_2}}{M_{CO_2}}} = \frac{r_{SO_2}}{r_{CO_2}} = \frac{1.4545}{1}$ OR $\frac{r_{SO_2}}{r_{CO_2}} = \sqrt{\frac{64}{44}} = 1.4545$
 $r_{SO_2} = 1.4545 \times 30 = 43.6363$
 $r_{CO_2} = 30$
 $t_{SO_2} = \frac{30}{43.6363} = 0.6875$
 $t_{CO_2} = 1$
 $t_{SO_2} = 0.6875 \times 60 = 41.25$ seconds
6. Oxidizing agent – SO₂ – Sulphur (iv) oxide
 Reducing agent – H₂S – 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 CH₃COO₄ = 25 X 1.05 = 26.25
 Mass per liter = 26.25 x 2 = 52.5
 Molar mass of CH₃COO₄ = 60
 Molarity = $\frac{52.5}{60} = 0.875$ mole/dm³
 Or
 Mass of CH₃COO₄ = 25 X 1.05 = 26.25
 Molar mass = 60
 Therefore: No of moles = $\frac{26.25}{60} = 0.4375$

$$\text{Molarity} = \frac{(0.4375 \times 1000)}{500} = 0.875 \text{ molar} / \text{dm}^3$$

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.
- Used for drying or keeping substances free from moisture
 - Used for supporting crucible during heating.
- 12.
- 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.
 - Used in the extraction of less reactive metals e.g. iron.
- 13.
- Is a group of compounds with similar chemical properties, chemical formulae and exhibit gradual change in physical properties.
 - Pentane
 2- Methylbotane
 2,2- dimethylptopane
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.
- Hexane
 - 2 – methyl propane
- 16.
- Charred black mass of carbon. H₂SO_{4(l)} removes elements of water from sugar leaving carbon.
 - $C_{(s)} + 2H_2SO_4(l) = 2SO_2(g) + CO_2(g) + 2H_2O(l)$
- 17.
- $2PB(NO_3)_2(s) \xrightarrow{\text{heat}} 2PBO(s) + 4NO_2(g) + O_2(g)$
 - No of moles $2NO_2 = \frac{0.58}{24} = 0.0242$
 No of moles PB (NO₃)₂ = $0.02417 \times \frac{1}{2}$
 = 0.01208
 Mass of PB (NO₃)₂ = $207 + (14 + 48)_2$

=
3
3
1

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2
0
8
X
3
3
1

$$= 3.99848$$

$$= 4.0\text{g}$$

18.

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

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

$$20. \text{Mass of carbon} = \frac{12}{44} \times 5.94 = 1.62$$

$$\text{Mass of hydrogen} = \frac{2}{18} \times 2.43 = 0.27$$

18

$$\text{Total mass} = (1.62 + 0.27) = 1.89$$

$$0.0675 \text{ moles of CH} = 1.89$$

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

0.0675

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

$$(\text{CH}_2)_n = 28 \quad \text{therefore} \quad \text{MF} - \text{C}_2\text{H}_4$$

$$N=2$$

$$21. \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

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

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

$$P_2 = 608 \text{ Hg}$$

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)

$\text{PbO}_{(l)}$

+
 g

H_2

(g)

$\text{Pb}_{(s)}$

+
+

H_2

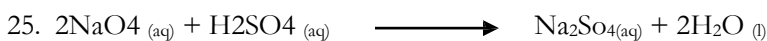
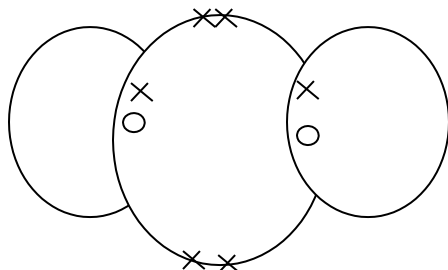
$\text{O}_{(g)}$





(ii) $\text{CaCl}_2 / \text{CaO}$

24.



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

$$\text{Moles of NaO}_4 = \frac{0.2 \times 25}{1000} = 0.005 \text{ moles}$$

$$\text{Moles of Naso4} = \frac{0.005}{2} = 0.0025$$

$$\text{Hence molarity} = \frac{0.0025}{10} \times 1000$$

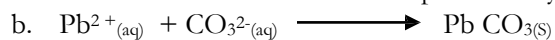
$$= 0.25 \text{ moles / litre}$$

26. A $\begin{matrix} H \\ O \end{matrix}$ deliquescent substance is one which absorbs too much water from the atmosphere to form a solution.

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



28.

a. Liquid

b. Through repeated compression (200 atoms) and expansion of air which cools it to liquid at -200°C

c. Argon