**MARKING SCHEME**

**CHEMISTRY PAPER 2**

**ARISE AND SHINE**

**FORM 4 TRIAL 1 EXAMINATION**

**MARCH/APRIL 2023**

1. (a). Alkali metals √1

(b). (i) A is more reactive than D√1 the outermost energy level electron in D is more firmly

 held than in A

 (ii). J is more reactive than√1/2 K the nuclear electron attraction is higher in J than in K ½

 (c). F has a larger atomic radius than F√1 nuclear change increases across the period√1

 (d). Before G OR

|  |  |
| --- | --- |
| √ | G |
| F |  |

 (e) C√1

 (f) EK3√1 or AlCl3√1

(g). ionic/electrovalent bond√1 it is formed through transfer of electrons from metal to a non-

 metal√1

(k) Use in light bulbs

(i) C - 2,8,8,8, √1/2

 G - 2,8 √1/2

1. (a). The enthalpy change of a reaction is the same regardless of the reaction happening in one

 or many steps provided that the initial reactants and products are the same √1

OR

The energy change in converting reactants to products is the same regardless of the route followed. √1

(b)(i) √1/2 √1/2



(ii). It’s the energy change when a compound is formed from its constituent element

(iii). ∆H+ = 4 (-393) + 5 (-296) – (-2877) √1

 = -1572 – 1480 + 2877

 = -3052 + 2877

 = -175KJ/mol √1

C (i) A - hydration energy√1/2

 B - Lattice energy√1/2

 C - Heat of solution√1/2

(ii) ∆HC = ∆HA + HB√1/2

3. (a).(i) I Zn(OH)2 (1mk) / Zinc hydroxide√1

 II Zinc chloride (1mk) / ZnCl2√1

 III Zinc Oxide 1mk /ZnO√1

(ii). Pb2+(aq) + 2Cl-(aq)$ \rightarrow $ PbCl2(s) (1mk) penalize ½ for missing or wrong state symbols

(iii). A white precipitate which dissolves in excess ammonia solution observed√1 (1mk)

(b).i) Hydrogen√1

 ii). To provide a large surface area one which the gas dissolves in water√1

 iii). - From electrolysis of aqueous sulphuric (VI) acid

* Form electrolysis of brine
* cracking of alkanes
* A by-product of petroleum industry any(1mk)

iv). Removing rust from iron/decaying of Iron before galvanizing and other metals before

 Electroplating

* Sewage treatment
* Making dyes
* Manufacture of silver chloride used on photographic films (any 2 for 1 mark each)

4. (a). Solubility is the maximum amount of solute that can dissolve in a solvent at a particular temperature

4.(ii)



4.(b)i)

ii) 136($\pm 1$) g/100g

iii) Saturation at 10oC = 80g√1/2

 at 80oC = 148g√1/2

Salt added is 148 - 80√1/2 = 68g√11/2

iv. - Use to determine the mass of crystals obtained when saturated solution cools

* Used to separate substances of different solubilities
* - used to know the effect of temperature on solubility of salts(Any 2 for 2 mk each)

v. Fractional crystallisation√1

5.a) (i) 2,2 – dimethyl/propane√1

 (ii). Pent – 2 – yne √1

b). Ignite each, 2, 2 - dimethyl/Propane burns with a non-sooty flame while pent -2-yne burns

 with a sooty flame

- Pass each through H+/KMnO4 i. does not decolourise H+/KMnO4 while (ii) decolourise

- Use bromine water in the dark.

C (i). L – Ethylmethanoate√1

 N – Ethane√1

(ii) H H H H H H

C C C C C C √1

H H H H H H

iii). Reagent - water hydrolysis Reagent-steam√1

 Condition conc.H2SO4 (liquid) condition H3PO4

iv Step 2 – Extrication

 Step 3- Substitution

v CI CI CI CI

 H C C H H C C CI

CI CI H CI

6.



ii. At 25oC-solid the ions are at fixed position while at above 801oc the ions are mobile√1

b. It is polar√1 due to hydrogen bonding

c x - covalent√1/2

 y - coordinate/Dative√1/2

d.i) Allotropes√1

 ii). Add methylbenzene and swirl√1 (stir) to dissolve fullerenes filter√1 to obtain a solution of

 fullerene in methylbenzene leave the solution in the solution for methylbenzene to

 evaporate√1

 √1

iii. n = $\frac{720}{12}$ = 60 (C60√1/2)

7. (a). x - Carbon (IV) oxide√1

 y - Calcium hydroxide√1

 (Penalize fully if formula is given)

(b). Ammonia gas/NH3

 Carbon (IV) oxide/CO2

 Water/H2O

(Any two for ½ mark each)

c). S - Thermal decomposition√1

 R - Filtration√1

(d). Q – NaCl (aq) + NH3 (g) + CO2 (g) + H2O (l) $\rightarrow $ NH4cl (aq) + NaHCO3 (s)

 T - Ca(OH)2 (aq) + 2NH4c l(aq) $\rightarrow $ CaCl2 (aq) + 2NH3 (g)+2H2O(l)

 (Penalize ½ mk for missing /wrong state symbols)

e). - Used in extraction of sodium metal

 used in road surfacing due to its deliquescent nature

* Used for de-frosting snow in cold countries during winter.

(Any two for 1mk each)

(f) Mg2+ (aq) + CO2-3 (aq) $\rightarrow $MgCO3 (s)

OR

 Ca2+ (aq) + CO2-3 (aq) $\rightarrow $CaCO3 (s) √1

Carbonate ions react with either calcium ion or magnesium ions present in hard water to form insoluble calcium carbonate or magnesium carbonate which is precipitated out √1

(g). - Used in paper industry

- Use in glass making

- Manufacture of detergents.

(Any two)