**MOMALICHE JOINT EXAMINATIONS**

**PRE-MOCK JUNE 2022**

**√CHEMISTRY 233/1 MARKING SCHEME**

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| **NO** | **ANSWER** | **REMARKS** |
| 1 | 1. The laboratory gas burns in excess oxygen 1 OR There is no unburnt carbon 1C:\Users\SERVER\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\021.jpg | NB: ½ for straight shape of flame |
|  |  | 3 |
| 2 | Crush the nuts using mortar and pestle 1  Add appropriate solvent e.g Acetone and continue crushing 1  Filter/decant the mixture to obtain a solution of oil in filtrate½  Allow the filtrate/Acetone to evaporate in the sun½ |  |
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|  |  | 3 |
| 3 | 1. 2I-(aq)  I2 (g)  + 2e- 1   Pb2+ (aq) + 2e- Pb(s)  1   1. Extraction of reactive metals   Purification of metals  Electroplating  Manufacture of pure chemicals e.g Cl2, NaOH etc | Any: one |
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|  |  | 3 |
| 4 | Molarity/ conce. Of NaOH = 8/40 = 0.2  Moles of NaOH in 25cm3 = 0.2 x25 = 0.005mol  1000  H+ + 2OH- H2O ; M.R = 1:2  Moles of acid = ½ x 0.005 = 0.0025 mol  R.M.M = 0.245 = 98  0.0025 |  |
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|  |  | 3 |
| 5 | 1. Zinc blende 1 2. 2ZnO (s) + C (s)  2Zn (s) + CO2 (g) 1 3. Manufacture of dry cell ½   Galvanizing of iron ½ |  |
|  |  | 3 |
| 6 | 1. (i) S 1   (ii) Q 1   1. Sodium hydroxide/ potassium hydroxide 1 |  |
|  |  | 3 |
| 7 | 1. Stable 1 2. R 1   As the number of electrons the same energy level, nuclear attraction increases leading to decrease in atomic radius 1 |  |
|  |  | 3 |
| 8 | 1. Frasch process 1 2. Hot compressed air 1 3. Monoclinic/prismic ½   Rhombic/alpha ½ |  |
|  |  | 3 |
| 9 | 1. A 2.8.1 ½   B 2.1 ½   1. B 1: Strong attraction of outermost energy level electrons towards the nuclear 1 |  |
|  |  | 3 |
| 10 | 1. Time taken for a given mass of a radioactive isotope to reduce to half its original mass 1 2. No. of half-life = 100 = 4   25  5/W = (½)4 = W = 80 g  OR  X → ½x → ¼x → 1/8x → 1/16x  1/16x = 5 g x = 80 g |  |
|  |  | 3 |
| 11 | 1. Equilibrium shifts to the right ½ to replace ammonia gas absorbed by water molecule ½ 2. Equilibrium shifts to the right ½ to use up nitrogen gas added ½ 3. Forward reaction is exothermic ½ hence forward by low temperature: Equilibrium shifts to the right ½ |  |
|  |  | 3 |
| 12 | 1. (i) X- Bromoethene ½   N- Ethylhydrogen sulphate ½   1. M- Bromine gas ½   H H H H  C ꞊ C n C− C 1  H H H H n | NB;carbon atom MUST have 4 covalent bonds |
|  |  | 3 |
| 13 | 1. Rate of diffusion of fixed mass of a gas is inversely proportional to the square root of its density 1 2. RHCl = 30/20 = 1.5cm3/s   1.5/RB = 64/36.5 RB = 1.1333cm3/s  If 1sec = 1.1333cm3  ? = 42cm3 = 37 sec |  |
|  |  | 3 |
| 14 | 1. CuO(s) + H2 (g) → Cu (s)  + H2O (l) 2. Add anhydrous copper II sulphate 1 to D, if changes to form white to blue 1 OR dip cobalt (II) chloride paper into substance D; if changes from blue to pink 1 |  |
|  |  | 3 |
| 15 | 1. Soapless detergent½   C:\Users\SERVER\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\022.jpg   1. Non-biodegrable 1 | Accept **K+** in the reagent X |
|  |  | 2 |
| 16 | 1. Different forms of pure substance/Element existing in the same physical state 1 2. Has layers bonded with weak vander waal forces which slide on slight heating 1 3. Sulphur 1 |  |
|  |  | 3 |
| 17 | Place the sodium carbonate in a test tube containing water and stir to make a solution 1  Place the lead (II) nitrate in another test tube containing water to make a solution 1  React an equal portions of the two solution in a boiling tube to precipitate lead (II) carbonate ½  Filter off the precipitate as a residue and wash with distilled water. ½ |  |
|  |  | 3 |
| 18 | Bond breaking = (C=C) + (H-H) + 4(C-H)  = 612 + 435.9 + 4(413) ½  = +2699.9kJ½  Bond formation = (C-C) + 6(C-H)  = 347 + 6(413) ½  = -2825kJ½  Enthalpy change = (+2699.9- 2825) ½  = -125.1kJ½ |  |
|  |  | 3 |
| 19 | 1. Reacts with both oxygen ½ and nitrogen ½ in air 2. 3Mg (s) + N2 → Mg3N2 (s) 1   2Mg (s)  + O2 (g) → 2MgO (s) 1 |  |
|  |  | 3 |
| 20 | 1. Mass of iron = (12.66 – 10.98)   = 1.68 g½   1. Mass of oxygen = (13.30 – 12.66) = 0.64 g½ 2. Empirical formula   Element Fe O  Mass 1.68 0.64  R.A.M 56 16  Mole 0.03 0.04 ½  M .R 1x3 1.33x3 ½  3 4 ½  Formula Fe3O4 ½ |  |
|  |  | 3 |
| 21 | 1. Chlorine → melts and boils below room temperature (250C) 2. Bromine has large molecular/atomic mass√ 1 hence experience stronger √1 intermolecular force of attraction than chlorine 3. Chlorine has smallest atomic radius hence easily attract electrons /low shielding effect | 3 |
| 22 | 1. Q = It   = 0.5 x (32 x 60 + 10) = 9650√½  No. of faradays = 9650 √½  96500  = 0.01 F√½  No. of Faraday liberating 1 mole = (0.01 x 88)√½  0.44  = 2 F ½   1. XCl2 ½ |  |
|  |  | 3 |
| 23 | 1. Light blue precipitate√ formed that dissolves√ in excess ammonia forming a deep blue√ solution 2. Cu2+(aq)  + 2OH- (aq) → Cu(OH)2 (s)√   Light blue  Cu(OH)2 (s) + 4NH3 (aq) → Cu(NH3)4 2+ (aq)√  Deep blue |  |
|  |  | 3 |
| 24 | 1. a→Dative bond OR coordinate bond 1   b→Covalent bond 1   1. 7 x 2 = 14e- 1 |  |
|  |  | 3 |
| 25 | 1. ACl3 1 2. 2Al (s)  + 3Cl2 (g) → 2 AlCl3 (s) 1 3. Prevents moisture from entering the apparatus 1 |  |
|  |  | 3 |
| 26 | 1. When gases react, they do so in volumes that bear simple ratio to one another and to the products formed 1 2. C2Hx + 3O2 → CO2 + H2O   10 30 20 20  1 3 2 2 1  X = 4 1 |  |
|  |  | 3 |
| 27 | 1. Expel air from the combustion tube to avoid pre-oxidation of copper metal (hot) 1 2. Brown copper metal turns black 1 3. Nitrogen gas 1 |  |
|  |  | 3 |
|  | **TOTAL MARKS** | **80** |