**Term 2 - 2022**

**FORM 4**

**CHEMISTRY PAPER 2 (233/2)**

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
| **Question** | | **Answer** | **Marks** |
|  |  | Nuclear fission is the splitting process a heavy nuclide undergoes when bombarded by a fast moving neutron. | 1 mark |
|  | In both cases a large quantity of energy is released.  Both processes results in chain reactions. | 1 mark  1 mark |
| 1. (i) | **Scale:**  **Curve:**  **Plotting:**  C:\Users\Admin\Downloads\msg348895125-14579.jpg | 1 mark  1 mark  1 mark |
| (ii)I | 35 |  |
| II | 24.5 |  |
|  | Testing of nuclear weapons in the oceans also causes environmental pollution since plants and other living organisms may take in the radioactive materials released in the water.  When not put into proper use, radioisotopes can be used as weapons of mass destruction | 1 mark  1 mark |
| **Total** | | | **10 marks** |
|  | 1. (i) | 3 units |  |
|  | (ii) | D:\m\images (3).png | 1 mark |
|  | (iii) | They do not decompose easily, i.e., are non-biodegradable. This results in environmental pollution.  Some synthetic polymers give off poisonous gases when they burn, e.g., polythene gives off hydrogen cyanide and carbon(IV) oxide. | 2 marks |
|  |  | Tetraoxophosphate  Enzymes | 1 mark  1 mark |
|  |  | C2H4 + H2O → C2H5OH  Molecular mass of ethene 12 x 2 + 1 x 4 = 28  Moles of ethene 56 ÷ 28 = 2 moles  Mole ratio 1 : 1  Moles of ethanol 2 moles  Molecular mass of ethanol  12 x 2 + 1 x 6 + 16 = 46  Mass of ethanol 2 x 46 = 92g | 1/2 mark  1/2 mark  1/2 mark  1/2 mark |
|  | 1. (i) | Alkanols | 1 mark |
|  | (ii) | D:\m\images (4).png | 1 mark |
|  | (iii) | (C3H6O)n = 116  (3 x12 + 1 x 6 + 16)n= 116  58n=116  n=2  C5H11COOH/C6H12O2  D:\m\images (7).png | 1/2 mark  1/2 mark  1 mark |
|  | (iv) | Put 2 cm3 of Q in a test tube.  Add 1 cm3 of sulphuric (VI) acid.  Add an alkanol-**any** to the test tube and warm.  A pleasant smell is produced. | 1/2 mark  1/2 mark  1/2 mark  1/2 mark |
| **Total** | | | **14 marks** |
|  |  | Electricity charge 2 x 4 x 60 x 60=28,800C  28,800C x 24,000cm3  (96,500 x 4) =1,790.67 cm3 | 1 mark  1 mark |
|  | 1. (i)(I) | +1.23V/half-cell**XI** | 1/2 mark |
|  | (II) | -2.71V/ half-cell **IV** | 1/2 mark |
|  | (ii) |  | 3 marks |
|  | (iii) | Pb(s) + Cu2+(aq) → Pb2+(aq) + Cu(s)  +0.34 +0.13=**+0.47V** | 2 marks |
|  | (iv) | Formation of insoluble PbSO4. This reduces the concentration of ions in the electrolyte/reduces the effectiveness of the cell. | 1 mark |
|  | (v) | Pb(s)|Pb2+(aq) || Cu2+(aq)|Cu(s) **Eθ** = +**0.47V** | 1 mark |
|  | (vi) | 2Fe(s) →  2Fe2+(aq) + 4e- +0.44V  O2(g) + 2H2O (l) + 4e- → 4OH-(aq)+0.40V  2Fe(s) + 3/2O2(g) + 2H2O (l) → Fe2O3.2H2O(s)**+0.84V** | 1 mark  1 mark |
|  | (vii) | Improve appearance.  Prevent corrosion. | 1 mark  1 mark |
| **Total** | | | **14 marks** |
|  |  | B | 1 mark |
|  |  | I | 1 mark |
|  |  | Alkaline Earth Metals | 1 mark |
|  |  | √ indicated on the diagram. | 1 mark |
|  |  | D has more protons which increases the effective nuclear charge attracting the valence electrons firmly to the nucleus. | 1 mark |
|  |  | The incoming electrons experiences repulsion from the existing electrons.  The energy level expand to accommodate the incoming electrons. | 1 mark  1 mark |
|  |  | C:\Users\Admin\Downloads\msg348895125-14580.jpg  C |  |
|  |  | Chloride of E has ionic bonds throughout its giant ionic structure while chloride of E is a molecule with weak van der waals forces of attraction throughout its simple molecular structure. | 1 mark |
| **Total** | | | **10 marks** |
|  |  | Weigh about 1g clean magnesium ribbon in a crucible.  Heat the crucible, occasionally lifting the lid to let air in.  Do not allow any contents to escape from the crucible.  When all the magnesium has burned, allow the crucible to cool.  Weigh the cool crucible and its contents again.  Determine the change in Mass by (**Mass of crucible + Magnesium before burning**) -  (**Mass of crucible + contents after burning**) | 1/2 mark  1/2 mark  1/2 mark  1/2 mark  1/2 mark  1/2 mark |
|  | 1. (i) | **Step 2** Zn2+ and Al3+  **Step 5** CO32- and SO32- | 1 mark  1 mark |
|  | (ii) | 2H+(aq) + CO32-(aq) →H2O(l) + CO2(g)/  2H+(aq) + SO32-(aq) →H2O(l) + SO2(g) | 1 mark |
|  | (iii) I | Formations of a colorless solution  Brown solid deposited  Effervescence | 1 mark  1 mark |
|  | II | Zinc | 1 mark |
|  | III | Zn2+(aq) + 2OH-(aq) → Zn(OH)2(s)  Zn(OH)2(s) + 2OH-(aq) →[Zn(OH)4]2-(aq) | 1 mark  1 mark |
| **Total** | | | **11 marks** |
|  | 1. (i) | Solidification | 1 mark |
|  | (ii) | **A** Sulphorous acid/sulphuric (IV) acid  **B** Potassium sulphite  **C**Sulphur  **D**Water | 1/2 mark  1/2 mark  1/2 mark  1/2 mark |
|  | (iii) | Oxidizing | 1 mark |
|  | 1. (i) | Burning magnesium produces a lot of heat.  That decomposes carbon (IV) oxide to carbon and oxygen.  Oxygen is used to continue burning forming a white solid of magnesium oxide. | 1 mark  1 mark  1 mark |
|  | (ii) I | Carbon (II) oxide | 1 mark |
|  | II | CO(g) + CuO(s) → Cu(s) + CO(g) | 1 mark |
|  | III | Black solid changes to brown. | 1 mark |
| **Total** | | | **11 marks** |
|  | 1. (i) | Galena/lead (II) sulphide/Cerussite | 1 mark |
|  | (ii) | **A** Sulphur (IV) oxide gas  **B** Iron  **C** Slag | 1 mark  1 mark  1 mark |
|  |  | SiO2(s) + CaO(s) →CaSiO3(l) | 1 mark |
|  |  | Zinc blende/Silica | 1 mark |
|  |  | Froth flotation | 1 mark |
|  |  | 2PbS(s) + 3O2(g) →2PbO(s) + 2SO2(g) /  PbCO3(s) →PbO(s)  + CO2(g) | 1 mark |
|  |  | Used in lead acid accumulators as lead plates | 1 mark |
|  |  | Emission of Sulphur (IV) oxide forms acid rain which corrodes stone buildings and metallic structures. | 1 mark |
| **Total** | | | **10 marks** |
|  | | |  |
|  |
| **80 marks** |