|  |
| --- |
| **DEPARTMENT OF CHEMISTRY****FOURAH BAY COLLEGE – UNIVERSITY OF SIERRA LEONE**CHEM 221P-BLOCK CHEMISTRY AND FURTHER REACTIVITY**Unit 1 – The Chemistry of the p-block****CONTINUOUS ASSESSMENT****TEST****10.00 am Monday 27th August**Name: ……………………………………………………Adm/Reg No. ………………..Unit 1 Continuous Assessment is worth 15% of the total marks for CHEM 221Your score will be divided into three parts:Lecture and Tutorial Attendance 10%Assignment 40%Test 50% |

****

You may tear this page out but you must not write on it and must hand it in with the rest of your paper

|  |  |
| --- | --- |
| 1. | Write equations for the reaction of aluminium and thallium with dilute nitric acid. State the oxidation numbers of aluminium and thallium in the salts formed and explain any differences.………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |
| **2.** | Aluminium chloride and boron fluoride are both covalent halides but have different structures in the gas phase. Describe the structure and bonding in both compounds and comment on any differences.……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |

|  |  |  |
| --- | --- | --- |
| **3.** | (a) | Aluminium oxide is amphoteric. Write equations to show how aluminium oxide reacts with hydrochloric acid and with sodium hydroxide.……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………… |
|  | (b) | Boron oxide is not amphoteric. State the acid-base character of boron oxide and explain why it is different from aluminium oxide.………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |
| **4.** | Describe, with the aid of a diagram, the structure and bonding in diborane.……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |

|  |  |  |
| --- | --- | --- |
| **5.** | (a) | Explain why carbon forms a stable monoxide but silicon does not.……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………… |
|  | (b) | Write an equation to show how SiCl4 reacts with water and explain why CCl4 does not react with water.………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |
| **6.** | Describe the structure and bonding in the two main allotropes of carbon.……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |

|  |  |  |
| --- | --- | --- |
| **7.** | (a) | Explain why PbO2 is a good oxidising agent but SnO2 is not.……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………… |
|  | (b) | Write equations to show how PbO2 and SnO2 react with hydrochloric acid. State the type of reaction occurring in each case.………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |
| **8.** | (a) | Explain why carbon has a greater tendency to catenate than silicon.……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………… |
|  | (b) | Explain why silicate rocks tend to be polymeric but carbonate rocks tend not to be.………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………[5] |