



NATIONAL OPEN UNIVERSITY OF NIGERIA
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF PURE & APPLIED SCIENCES
2020_1 EXAMINATION

CHM 424 - NON AQUEOUS SOLVENTS

CREDIT UNIT: 2

INSTRUCTION: Answer question 1 and any other three questions.

Duration: 2 hours

QUESTION 1

- a. Give properties of phosphoryl chloride **(6 mks)**
- b. What are the general characteristics of polarprotic solvent? **(6 mks)**
- c. Write the equation for the following reaction of POCl_3 , autoionization, reaction with triethylmine and with Iron (iii) chloride. **(8 mks)**
- d. Enumerate demerits of using water as solvent. **5 mks**

QUESTION 2

- a. Enumerate the characters of dinitrogen tetroxide that can be used as medium for conducting chemical reactions **(8 mks)**
- b. Give the physical properties of liquid N_2O_4 **(7 mks)**

QUESTION 3

- a. With typical equations represent the reactions of N_2O_4 with lithium, sodium, aluminum and zinc nitrate **(8 mks)**
- b. With appropriate equations represent the solvolytic reactions of N_2O_4 with $(\text{C}_2\text{H}_5)_2\text{NH}_2\text{Cl}$, MCl , $(\text{MgCH}_2\text{O})_6\text{Cl}_2$, $(\text{Mg}(\text{ClO}_4)_2)$ and Li_2CO_3 **(7 mks)**

QUESTION 4

- a. Using suitable equations represent the adducts formation of N_2O_4 with inorganic compounds and comment of the stability of the product. **(8 mks)**
- b. Enumerate the special features of liquid SO_2 as solvent **“(5 mks)**
- c. Draw the resonance structure of SO_2 **(2 mks)**

QUESTION 5

- a. how does SO_2 undergo autoionization **(7 mks)**
8. With appropriate equations represent the neutralization reactions of SO_2 **(8 mks).**