



**NATIONAL OPEN UNIVERSITY OF NIGERIA**  
PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA  
**FACULTY OF SCIENCES**  
**DEPARTMENT OF PURE & APPLIED SCIENCES**  
**2021\_2 EXAMINATIONS**

**COURSE: CHM 424- NON AQUEOUS SOLVENTS    TIME ALLOWED: 2 HOURS**  
**INSTRUCTION: ANSWER QUESTION ONE (1) AND ANY OTHER THREE (3) QUESTIONS**

1. a. Explain why water is the best solvent for ionic compounds rather than liquid ammonia and sulphur (IV) oxide. **[6 marks]**
  - b. i. Define 'Trouton constant' and state it is significant in non-aqueous chemistry **[4 marks]**
    - ii. Give four reasons why Arrhenius definition of acid is defective **[8 marks]**
  - c. i. Outline four types of interactions that are necessary for the formation of a solution. **[4 marks]**
    - ii. Briefly explain the oxidising properties of  $\text{HNO}_3$  in both aqueous and non-aqueous medium **[3 marks]**
2. a. Give the condition under which the solvent 'levelling' effect of ammonia better than that of water **[6 marks]**
  - b. List seven physical properties of solvents **[7 marks]**
  - c. What are non-aqueous solvents? **[2 marks]**
3. a. List and explain the three types of liquid that can serve as solvents. **[9 marks]**
  - b. Outline three general characteristics of polar protic solvents **[3 marks]**
  - c. List three general characteristics of polar aprotic solvents **[3 marks]**
4. a. Outline five reasons for choosing water as a solvent in inorganic chemistry **[5 marks]**
  - b. What are the factors that make the choice of water as solvent disadvantageous? **[6 marks]**
  - c. Define acid and base according to Franklin's 'solvent-system concept' **[4 marks]**
5. a. i. State the concept of 'levelling effect' **[3 marks]**
  - ii. Outline three general characteristics of polar protic solvents **[3 marks]**
- b. With examples, differentiate between ionisable solvents and nonionisable solvents **[6 marks]**
- c. Outline three types of interaction that occurs during formation of solution **[3 marks]**