



NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, University Village, Cadastral Zone, Nnamdi Azikiwe Express way, Jabi, Abuja

FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY

OCTOBER 2022 EXAMINATION

COURSE CODE: CHM 426

COURSE TITLE: LANTHANIDES AND ACTINIDES

CREDIT UNIT: 2

TIME: 2 HOURS

Instruction: Answer Question ONE and ANY OTHER TWO Questions

Question 1

1a. Discuss the pattern of arrangement of elements in the periodic table according to the following:

- a. Arrangement into groups 8 MARKS
- b. Arrangement into periods 4 MARKS
- c. Arrangement into blocks **4 MARKS**

1b. Highlight five general physical properties of the lanthanides. **5 MARKS**

1c. Explain Uranyl salt 5 MARKS

1d. Write on Actinide contraction. **4 MARKS**

Question 2

2ai. State the characteristics of +3 oxidation states of Lanthanides. 6 MARKS

2a.ii. State the characteristics of +4 oxidation states of Lanthanides. 7 MARKS

2b. Write briefly on Actinide series. **7 MARKS**

Question 3

3a. State the reasons why Actinides are dangerous to the environment. **5 MARKS**

3b. Discuss the organometallic compounds of Lanthanides. **6 MARKS**

3c. Explain the term halogeno complexes. **5 MARKS**

3d. Highlight the properties of uranocene. **4 MARKS**

Question 4

4a. State the similarities between Scandium and Lanthanoids. **6 MARKS**

4b. Explain the nuclear applications of lanthanides. **5 MARKS**

4c. Highlight the steps of uranium recovery from nitric acid. **6 MARKS**

4d. Give the definition of urates. **3 MARKS**

Question 5

5a. Compare Lanthanides and Actinides in terms of

- i. Contraction **2 MARKS**
- ii. Ligand-metal interaction **2 MARKS**
- iii. Absorption spectra **2 MARKS**
- iv. Coordination chemistry **2 MARKS**

5b. Write on dangerous nature of depleted Uranium. **6 MARKS**

5c. List

- i. Two examples of oxides of actinides **2 MARKS**
- ii. Four examples of oxyhalides of actinides with their starting agents. **4 MARKS**