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

2aii. 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 Lanthanies 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**