



NATIONAL OPEN UNIVERSITY OF NIGERIA
Plot 91, University Village, Cadastral Zone, Nnamdi Azikiwe Express way, Jabi, Abuja
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2023_1 POP EXAMINATION

COURSE CODE: CHM 406

COURSE TITLE: NUCLEAR AND RADIOCHEMISTRY

CREDIT UNIT: 2

TIME: 2 HOURS

Instruction: Answer Question ONE and ANY OTHER TWO Questions

1a. fill the following table with respect to abundance of occurrence of naturally occurring Nucleotides

Number of Particles	Even/ Odd	Even/ Odd	Even/ Odd	Even/ Odd
Number of nucleotides		B		
Number of protons	A			D
Number of neutrons			C	

6 MARKS

1b. Distinguish between accidental and deliberate exposure to radiation **5 MARKS**

1c. Explain conservation laws in radioactive decay **5 MARKS**

1d. Explain methods of handling hazardous nuclear wastes **6 MARKS**

1e. Highlight the general principles to uphold for health aspect of radiation control in a radiochemical laboratory. **5 MARKS**

1f. State the two discrete collective motions that can be visualized in collective nuclear model.

3 MARKS

Question 2

2a. State the rules that guide the prediction of nuclear stability **6 MARKS**

2b. Who is Juliot and Irene Curie? **4 MARKS**

2c. With given illustration/ example, write brief on the following;

- i. Nuclei with atomic number greater than 83. **5 MARKS**
- ii. Gamma ray emission. **5 MARKS**

Question 3

3a. Explain how Carbon-14 exhibit radioactivity **7½ MARKS**

3bi. What is Beta decay? **2 MARKS**

3bii. List the forms of Beta decay. **3 MARKS**

3biii. Explain any two of the list provided in 3bii above **7½ MARKS**

Question 4

4a. Highlight some general nuclear properties. **4½ MARKS**

4b. Explain the Collective nuclear model. **7½ MARKS**

4c. Write briefly on nuclear fusion reactor **3 MARKS**

4di. explain the concept of electron capture **3 MARKS**

4dii. Give two examples of electron capture reactions. **2 MARKS**

Question 5

5a. Explain the concept, Lethal dose for one half the population. **3 MARKS**

5bi. List the basic principles for keeping radiations exposure to minimum level **3 MARKS**

5bii. Highlight the general principles involved. **5 MARKS**

5ci. Write briefly on tracks 5 MARKS

5cii. Explain cloud and bubble chambers as a form of track measurement 4 MARKS