



**NATIONAL OPEN UNIVERSITY OF NIGERIA  
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE  
EXPRESS WAY, JABI - ABUJA.**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCES**

**JANUARY/FEBRUARY 2018 EXAMINATION**

**COURSE CODE: CHM406**

**COURSE TITLE: Nuclear and radiochemistry**

**TIME: 2 Hours**

**INSTRUCTION: Question one is compulsory. Answer question one and  
any other three questions.**

**QUESTION ONE**

1a) Compare and contrast between chemical and nuclear reactions  
(8 mks)

1b) Describe briefly the three possible processes that could result from the interaction of an  
atomic particle with an atomic nucleus? (3mks)

1c) Write short notes on the use of radioactivity in each of the followings:

i. Archeology/Environmental studies

ii. Medicine

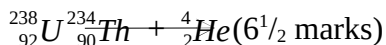
(11 mks)

1d) What is a chain reaction? Explain briefly.(3mks)

**QUESTION TWO**

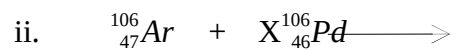
2a) A neutron-rich nucleus is bound to undergo certain transformations. Explain; and describe  
any emission involved. (8<sup>1</sup>/<sub>2</sub> marks)

2b) Identify and discuss the radioactive process in the chemical equation below



### QUESTION THREE

3a) Complete the following nuclear reactions using the symbol X to represent the new element formed or particle involved.



(15 mks)

### QUESTION FOUR

Expatiate on each of the followings:

- i. Nuclear fission
- ii. Nuclear fusion
- iii. Nuclear fusion reactor(15 marks)

### QUESTION FIVE

5a) Enumerate the general precautionary measures that must be taken against excessive radiation exposure in a radiation laboratory. (10<sup>1</sup>/<sub>2</sub> marks)

5b) What are the effects of excessive radiation exposure on human beings? (4<sup>1</sup>/<sub>2</sub> marks)