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

FACULTY OF SCIENCE

OCTOBER/ NOVEMBER, 2016 2016 EXAMINATION

COURSE CODE: CHM 406

COURSE TITLE: Nuclear Chemistry

CREDIT UNIT: 2

TIME: 2 Hours

INSTRUCTION: Answer any Four Questions

1a) What do you understand by the term "Radioactivity". (4 marks)

1b Differentiate between natural radioactivity and artificial radioactivity. ($5^1/_2$ marks).

1c) In a tabular form distinguish between chemical reactions and nuclear reactions.

(8 marks).

2a) Outline the three rules that guide the prediction of nuclear stability.

($6^1/_2$ marks).

(bi) Mention any four general principles by which the health aspects of radiation control are satisfied. (6 marks)

(ii) Write short notes on the two types of exposure to large dose radiation.

(5 marks)

3a) Comment on neutron-proton ratio and nuclear stability. (4 marks)

3b) Explain how the nuclei with higher neutron: protons than those within the stability belt can attain stability. (13 $^1/_2$ marks).

4a) Identify the symbol X in each of the following

i) $^{0}_{-1}X$ = ? ((ii) $^{4}_{2}X$ = ? (iii) $^{0}_{+1}X$ = ? (iv) $^{1}_{0}X$ =?

(8 marks)

b) List and write short notes on the basic principles recommended for keeping radiations exposure to a minimum level ($3^1/_2$ marks)

c) Discuss the contral/ protection of radiation measures in large organization (6 marks)

5. Explain briefly the following:

i. Chain reaction ($3^1/_2$ marks)
ii. Nuclear Fission ($6^1/_2$ marks)
iii. Nuclear Fusion ($3^1/_2$ marks)
iv. Nuclear Fusion Reactor (4 marks)

6a) List the subatomic particles that could be emitted during nuclear reactions. How is each of these particles formed ?

($8^1/_2$ marks)

6b**)** Give the properties of the sub-atomic particles mentioned in (6a) above (6 marks)

6c) Mention three applications of radioactivity. (3 marks)