



**CRAWFORD UNIVERSITY IGBESA**  
FAITH CITY, IGBESA, OGUN STATE  
2016/2017 RAIN SEMESTER EXAMINATIONS

**COLLEGE OF NATURAL AND APPLIED SCIENCES**

**DEPARTMENT:** *PHYSICAL AND EARTH SCIENCES*

**PROGRAMME:** *GEOLOGY AND MINERAL SCIENCES*

**COURSE TITLE:** *GEOCHRONOLOGY AND PRECAMBRIAN GEOLOGY OF AFRICA*

**COURSE CODE:** *GEM 204* **TIME ALLOWED:** *3HRS*

**INSTRUCTION:** *ANSWER ANY FOUR QUESTIONS*

- 1a. A radioactive sample contains  $3.25 \times 10^{18}$  atoms of a nuclide that decays at a rate of  $3.4 \times 10^{13}$  disintegrations per 26 min.
- (i) What percentage of the nuclide will have decayed after 159 days?  
(ii) What is the half-life of the nuclide?
2. The half life in two different samples, A and B, of radio-active nuclei are related according to  $T(1/2,B) = T(1/2,A)/2$ . In a certain period, the number of radio-active nuclei in sample A decreases to one-fourth the number present initially. In the same period the number of radio-active nuclei in sample B decreases to a fraction f of the number present initially. Find f.
- 3a. The half-life for the following process is  $4.5 \times 10^9$  yr.  
 $^{238}\text{U} \rightarrow ^{206}\text{Pb}$   
A mineral sample contains 43.20 mg of U-238 and 14.50 mg of Pb-206. What is the age of the mineral?
- b. If  $N = N_0 e^{-\lambda t}$ , derive an expression for t
4. You measured the radioactivity of a substance in the laboratory, then when measuring it 120 days later, you found that it has 54.821% of the radioactivity it had when you first measured it. What is the half-life of that substance? Given that:
- $$t_{1/2} = \frac{\text{Elapsed time} \times \log 2}{\log \left[ \frac{\text{beginning amount}}{\text{ending amount}} \right]}$$
5. Write short notes on the following:
- history of the Precambrian Era
  - Occurrence and distribution of Precambrian rocks
  - Economic significance of Archean greenstone-granite deposits
6. What do you understand by the words 'Cratonization and Precambrian Shields'?  
Give 3 examples of Cratons that you know

**GOD BLESS YOU.**