CRAWFORD UNIVERSITY
IGBESA
FAITH CITY, IGBESA, OGUN STATE

2021/2022 RAIN SEMESETER EXAMINATION

COLLEGE OF NATURAL AND APPLIED SCIENCES

DEPARTMENT: *PHYSICAL AND EARTH SCIENCES*

COURSE TITLE: *GEOCHRONOLOGY AND PRECAMBRIAN GEOLOGY OF AFRICA*

COURSE CODE: ***GEM 204*** ***TIME ALLOWED: 3:00Hours***

INSTRUCTION: ANSWER ALL QUESTIONS IN PART A AND ANY OTHER TWO FROM PART B

PART A

1. (a) Write a balanced nuclear equation for each of these changes.
   (i) Alpha emission from plutonium-242.
   (ii) Beta emission from magnesium-28.
   (iii) Electron capture by argon-37.

   Note: Use the periodic table provided to work out the name of the element that is produced

   (b) If $N = N_o e^{-\lambda t}$, derive an equation for t. show your derivations in a step-wise fashion

   (c) Explain the major disadvantage of K-Ar method that makes it difficult for the application of the result obtained to decipher polyphase geological contexts.

2. (a) ^{147}Sm contains 3.25×10^{18} atoms of a nuclide that decays at a rate of 3.4×10^{13} disintegrations per 26 min, what percentage of it will have decayed after 159 days?

   (b) Uranium has two different nuclides, labeled ^{238}U and ^{235}U Initially, the sample composition is 1:1, i.e., the same number of ^{238}U as ^{235}U. The half-life of ^{238}U is 3 hours and, that of ^{235}U, 6 hours. What is the expected ratio ^{238}U / ^{235}U after 18 hours?

   (c) ^{40}K has a half-life of 3.6 days. If one had 6.02×10^{23} atoms at the start, how many atoms would be present after 20.0 days?

PART B

3. Highlight the events that characterized Africa's geologic history after the Precambrian.
4. Describe the oldest rocks of the Archean Eons and the cratons where they are found.
5. Briefly describe the five African orogenic cycles.
6. Enumerate the divisions of geologic time.