



NATIONAL OPEN UNIVERSITY OF NIGERIA

Plot 91, University Village, Cadastral Zone, Nnamdi Azikiwe Express way, Jabi, Abuja

**FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY**

OCTOBER 2022 EXAMINATION

COURSE CODE: CHM 407

COURSE TITLE: REACTION KINETICS

CREDIT UNIT: 2

TIME: 2 HOURS

Instruction: Answer Question ONE and ANY OTHER TWO Questions

Question 1

1ai. Explain the rate of a chemical reaction. **3 MARKS**

1a.ii. Explain first Order reaction. **3 MARKS**

1bi. List the different types of catalysis. **3 MARKS**

ii. Give illustrative reaction of the different types of catalysis listed in (i) above. **6 MARKS**

iii. Mention one example in each of the reactions illustrated in (ii) above. **3 MARKS**

1c. state

i. the similarities between spectrophotometer and colorimeters. **3 MARKS**

ii. the differences between spectrophotometer and colorimeter. **3 MARKS**

1d

i. State Stark-Einstein Law of Photochemical Equivalence. **3 MARKS**

ii. Highlight the application of the law stated in (1di) aabove. **3 MARKS**

1c. Enumerate on how a reactant molecule attains activation energy. **19 MARKS**

Question 2

2ai. Using NO_2 decomposition as illustration, specify the rate of the chemical reaction. **6 MARKS**

2a. State the deductions from the chemical reaction specified in 2ai above. **3 MARKS**

2b. Using illustrations, explain the order of a chemical reaction. **3 MARKS**

2c. Derive the equation useful in calculating the half-life of a second order reaction. **8 MARKS**

Question 3

3a. Differentiate between differential rate laws and integrated rate laws. **5 MARKS**

3bi. What are pseudo-first order reaction? **2 MARKS**

3bii. Write on acid hydrolysis of ester as a pseudo-first order reaction. **6 MARKS**

3c. Enumerate how a reactant molecule attains activation energy. **7 MARKS**

Question 4

4ai. Define Zeroth order reaction and give its rate law. **3 MARKS**

4a.ii. characteristics of Zeroth order reaction. **3 MARKS**

4a.ii. State **three** examples of zeroth order reactions **6 MARKS**

4b. Write on consecutive reactions. **8 MARKS**

Question 5

5a. Explain the molecularity of a reaction. **6 MARKS**

5b. Write on steric factor with respect to molecular collision. **6 MARKS**

5c. Write on the quantum efficiencies for:

i. the formation of a product **4 MARKS**

ii. the disappearance of a reactant. **4 MARKS**