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OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER REGULAR EXAMINATION

FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE

COURSE CODE: **CHE 420E**

COURSE TITLE: **PHOTOCHEMISTRY**

DATE: 26/1/2022 **TIME: 2-5PM**

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

THIS PAPER CONSISTS OF PRINTED PAGES 3 **PLEASE TURN OVER**

CHE 420 E

REGULAR – MAIN EXAM

CHE 420 E: PHOTOCHEMISTRY

STREAM: BED (Scie) **DURATION: 3 Hours**

INSTRUCTIONS TO CANDIDATES

i. *Answer **ALL** questions.*

ii. *Diagrams may be used whenever they serve to illustrate the answer.*

iii. *Do not write on the question paper.*

Question One

Explain the following concepts

a. Photochemistry (2 Marks)

b. Quantization of light (2 Marks)

c. Grotthuss-Draper law (2 Marks)

d. The Stark-Einstein law (2 Marks)

e. Overall Quantum Yield (2 Marks)

f. Photolysis (2 Marks)

Question Two

Discuss the principal reaction types for ketone excited states (12 Marks)

Question Three

a. Explain the three basic processes of light-matter interaction that can induce transfer of an electron between two quantized energy states (9 Marks)

b. Describe the light sources used in photochemistry (3 Marks)

Question Four

a. Describe the steps involved in the photo halogenation of a hydrocarbon (6 Marks)

b. Describe the necessary conditions for the generation of laser light (6 Marks)

Question Five

Draw a well labelled Jablonski diagram for an organic molecule illustrating excited state photo physical processes (12 Marks)

Question Six

a. Explain the following relaxation processes for a molecule in the excited state

i. Intersystem crossing (2 Marks)

ii. Fluorescence (2 Marks)

iii. Phosphorescence (2 Marks)

b. Desribe the rapid ozone loss through photohemical reactions in the stratosphere (4 Marks)

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