



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

FACULTY OF SCIENCES

DEPARTMENT OF PURE AND APPLIED SCIENCES

JANUARY/FEBRUARY 2018 EXAMINATION

COURSE CODE: CHM 414

COURSE TITLE: PHOTOCHEMISTRY AND PERICYCLIC REACTIONS

TIME: 2 HOURS

**INSTRUCTION: Question one is compulsory. Answer question one and
any other three questions.**

QUESTION ONE

- 1ai Write briefly on absorption of light by atoms or molecules. (9 marks)
- 1b) Write short note on photochemical process. ($8\frac{1}{2}$ marks)
- 1c) Explain briefly electrocyclic reactions. ($7\frac{1}{2}$ marks)

QUESTION TWO

2a) Write short note on the following:

- i. Fluorescence (radiative decay pathway)
- ii. Internal conversion (Non radiative decay pathway) $7\frac{1}{2}$ marks

2b) Distinguish between dissociation and energy transfer. $7\frac{1}{2}$ marks

QUESTION THREE

3a) Discuss and show that the reaction between 1, 3-butadiene and ethene conforms to Diels-Alders reaction. (9marks)

3b) Distinguish between spontaneous emission and stimulated emission of light. (6marks)

QUESTION FOUR

4a) What is LASER? (2 marks)

4b) Describe how a LASER is produced. (10 marks)

4c) State one application of photochemistry. (3 marks)

QUESTION FIVE

5a) Using chemical equation, discuss industrial preparation of benzyl chloride by gas-phase photochemical reaction of toluene and chlorine. (11 marks)

5b) Elucidate the relationship between light absorption and energy difference between two energy levels involved in a transition. (4 marks)