



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A constituent of JKUAT)

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
TECHNOLOGY IN APPLIED CHEMISTRY

ACH 4410 : GREEN CHEMISTRY

SPECIAL/SUPPLEMENTARY EXAMINATION

FEBRUARY 2013 SERIES 2
HOURS

Instructions to candidates:

This paper consist of **FIVE** questions

Answer question **ONE** (compulsory) and any other **TWO** questions

Question ONE

- a) Solar energy is required for smog formation with the formation of the hydroxyl radicals that propagates other reactions
- (i) Show with equations how the hydroxyl radicals are removed in the atmosphere
(3marks)
 - (ii) Give the stepwise reaction mechanism of the hydroxyl radical with hydrocarbons
(5marks)
 - (iii) Give the reaction equations for the addition of the hydroxyl radical to produce 2-hydroxyl propamol altheide and formaldehyde **(10marks)**
- b) Briefly discuss the effects of smog **(12marks)**

Question TWO

- a) State what green catalyst are, giving some examples **(4marks)**
- b) What do you understand by the concept of atom economy? **(3marks)**
- c) Present the pragmatic challenges facing green chemistry **(13marks)**

Question THREE

- a) Define and discuss the concept of process intensification **(12marks)**
- b) Give the advantages that arise from process intensification process intensification **(8marks)**

Question FOUR

Green chemistry advocates for the use of alternate reaction media.

- (a) Give SIX examples of the alterate reaction media **(6marks)**
- (b) Discuss TWO of them **(14marks)**

Question FIVE

- a) Present and discuss the approaches by which the incidence of hazards in the chemical industry could be reduced **(8marks)**
- b) Give the principal considerations in inherent safety **(3marks)**
- c) Losses of vapour, solvent and gases to the atmosphere is common in the chemical industry. What factors used to be considered to minimize this? **(9marks)**