

CHUKA



UNIVERSITY

SUPPLEMENTARY / SPECIAL EXAMINATIONS

**THIRD YEAR EXAMINATION FOR THE AWARD OF BACHELOR DEGREE IN
SCIENCE (CHEMISTRY)**

CHEM 447: INDUSTRIAL AND APPLIED CHEMISTRY II

STREAMS: BSc (CHEMISTRY)

HOURS

TIME: 2

DAY/DATE: TUESDAY 17/11/2020

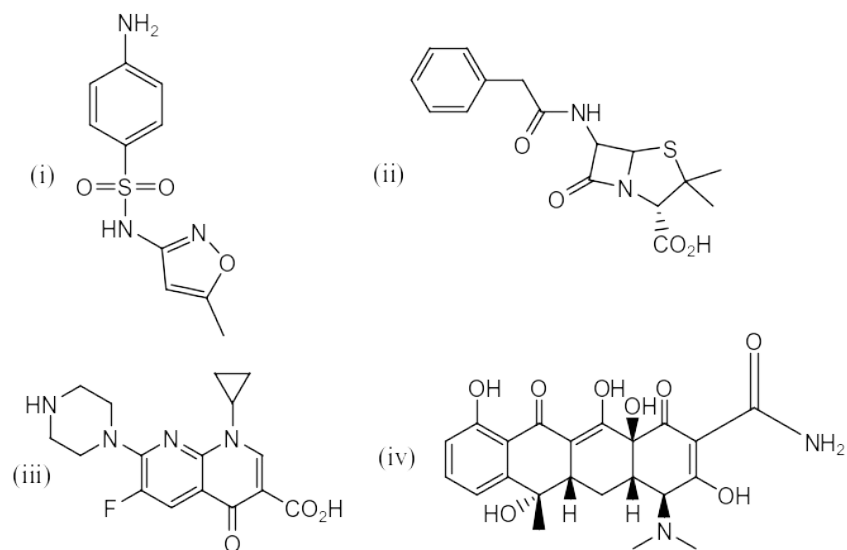
8.30 A.M – 10.30 A.M.

INSTRUCTIONS:

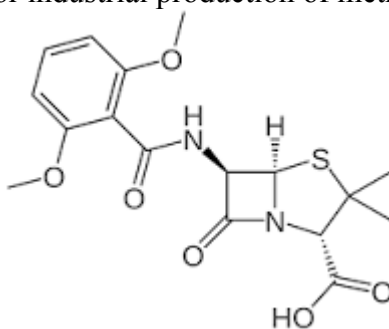
Answer question **One** (Compulsory) and any other **Two** questions

QUESTION ONE [30 MARKS]

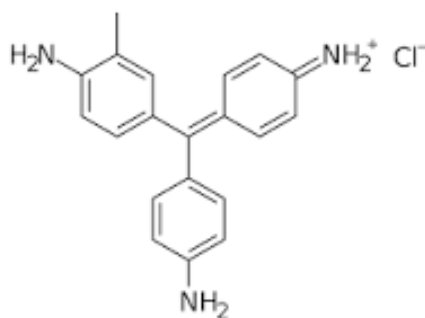
- (a) Discuss the purification processes of natural gas before domestic use (6 marks)
- (b) Discuss, with the aid of relevant equations, the catalytic cracking of hydrocarbons (6 marks)
- (c) Explain the mode of action of the following antibiotics (4 marks)



(d) Methicillin is a narrow-spectrum β -lactam antibiotic of the penicillin class. Design a semisynthetic stepwise method for industrial production of methicillin (6 marks)



(e) Design a stepwise method for preparation of rosaniline aniline and other reagents of your choice (8 marks)



QUESTION TWO [20 MARKS]

(a) Describe three parameters that can be used to determine the properties of crude oils (6 marks)

(b) Describe the industrial production of the following chemicals (6 marks)
 (i) Ethylene oxide (ii) Vinyl acetate (iii) Styrene

(c) Explain why the use of organochlorine chlorine pesticides has been terminated in many countries **(5 marks)**

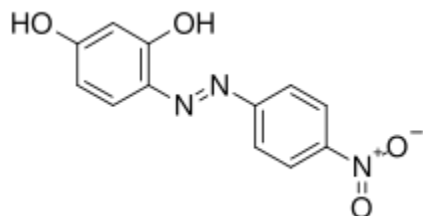
(d) Discuss the physico-chemical properties of the following pesticides **(3 marks)**

(i) Organophosphates (ii) Phenoxyacetic acids

QUESTION THREE [20 MARKS]

(a) Discuss the industrial production, properties and uses of low density polyethylene **(6 marks)**

(b) Design a stepwise method of synthesizing the Azo violet from aniline and other reagents of your choice **(6 marks)**



Azo violet

(c) Discuss, with the aid of suitable equation(s), the steam cracking of ethane **(8 marks)**

QUESTION FOUR [20 MARKS]

(a) Discuss, with the aid of relevant equations, the catalytic reforming of during naphtha fractions **(8 marks)**

(b) Describe, with the aid of relevant equation(s), the industrial manufacture of ibuprofen from isobutyl benzene **(6 marks)**

(c) Describe the industrial production of each of the following compound from butenes **(6 marks)**

(i) Acetic Acid (ii) Methyl ethyl ketone (iii) Methyl-*tert*-butyl ether (MTBE)

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