

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN
CHEMISTRY

CHIN 431: INDUSTRIAL PHARMACEUTICAL CHEMISTRY

STREAMS:

TIME:2 HOURS

DAY/DATE: THURSDAY 13/04/2023

8.30 A.M. –10.30 A.M.

INSTRUCTIONS

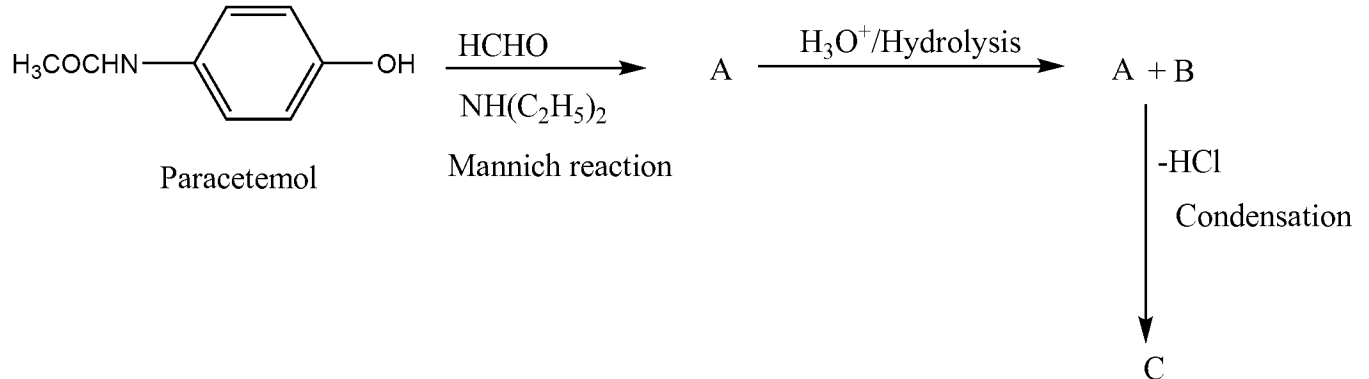
ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Draw the general structure of the antimalarial 7-chloro-4-aminoquinolines and give an example of antimalarial drug in that classification (2 marks)
- b) Briefly discuss two mechanisms of action of 1,4-substituted quinolines (4 marks)
- c) Briefly discuss the following terms
- i. Therapeutic index (2 marks)
 - ii. Principle of selective toxicity (2 marks)
 - iii. Binding site of a drug (2 marks)
- d) Briefly discuss the role of water and hydrophobic interactions on the interaction of a drug and its targets (4 marks)
- e) Differentiate between pharmacokinetics and pharmacodynamics (2 marks)
- f) I) Define enzymes (1 mark)
- II) Discuss the active site of an enzyme (2 marks)
 - III) Give three ways in which enzymes catalyze reactions (3 marks)
- g) Briefly compare the Fischer's Lock and Key hypothesis and the Koshland's theory of induced fit (4 marks)

QUESTION TWO (20 MARKS)

- a) Give four structure-activity relationships of 7-chloro-4-aminoquinolines antimalarial (4 marks)
- b) Draw the structures of the following products in antimalarial synthesis (6 marks)



- c) Discuss the following intermolecular bonding forces:
- i) Electrostatic or ionic bonds (3 marks)
 - ii) Hydrogen bonds (3 marks)
 - iii) Van der Waals interactions (3 marks)
- d) Give the importance of Repulsive interactions in drug-target interactions (1 mark)

QUESTION THREE (20 MARKS)

- a) Discuss two main ways in which drugs might be classified and give a suitable example (4 marks)
- b) Define a lead compound (1 mark)
- c) Discuss enhancing a side effect of a drug as a source of lead compound (3 marks)
- d) Discuss the secondary structure of proteins (4 marks)
- e) Briefly discuss the role of receptors as drug targets and give their types (4 marks)
- f) Briefly discuss intercalating drugs acting on DNA (4 marks)

QUESTION FOUR (20 MARKS)

- a) Using a suitable example, discuss three natural products sources of lead compounds (6 marks)
- b) Differentiate between

- i. Competitive and irreversible inhibitors (2 marks)
 - ii. Uncompetitive and non-competitive inhibitors (2 marks)
 - c) Briefly discuss Topoisomerase poisons (2 marks)
 - d) Discuss two mechanisms of antibacterial action (4 marks)
 - e) Draw the general structure of sulphonamide (1 mark)
 - f) Give three structure activity relations of sulphonamide analogues (3 marks)
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