

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE

CHIN 431: INDUSTRIAL PHARMACEUTICAL CHEMISTRY

STREAMS:

TIME: 2 HOURS

DAY/DATE: MONDAY 20/09/2021

8.30 A.M – 10.30 A.M

INSTRUCTIONS

■ Answer question one and any other two questions

QUESTION ONE (30 MARKS)

- (a) Define the following terms; [5 marks]
- (i) Drug
 - (ii) Therapeutic index
 - (iii) Principle of selective toxicity
 - (iv) Pharmacodynamics
 - (v) Pharmacokinetics
- (b) Discuss the first three levels of protein structure. [6 marks]
- (c) (i) Define an enzyme. [1 mark]
- (ii) List three factors involved in enzyme catalysis. [3 marks]
- (d) Differentiate between the following terms. [4 marks]
- (i) Competitive and uncompetitive inhibitors
 - (ii) Reversible and irreversible inhibitors
- (e) Briefly discuss the following drugs that interact with the DNA. [4 marks]
- (i) Intercalating agents
 - (ii) Topoisomerase poisons
- (f) (i) Using suitable equations for metabolism of prontosil to sulphanilamide explain a pro drug. [4 marks]

- (ii) List two conclusions on the structure activity study of sulphanilamide. [2 marks]
- (g) Draw the general structure of penicillins and label the parts. [2 marks]

QUESTION TWO (20 MARKS)

- (a) Briefly discuss three intermolecular bonds interaction between a drug and a target. [6 marks]
- (b) Explain three ways in which drugs might be classified or grouped using a suitable example. [6 marks]
- (c) Differentiate between the terms lead compound and pharmacognosy. [2 marks]
- (d) By use of a suitable example, briefly discuss three natural products sources of lead compounds. [6 marks]

QUESTION THREE (20 MARKS)

- (a) Define an active site of an enzyme. [1 mark]
- (b) Give two roles of the amino acids present in the active site. [2 marks]
- (c) Differentiate between Fischer's lock and key hypothesis and Koshlands theory of induced fit. [3 marks]
- (d) (i) Differentiate between a bacterial and an animal cell. [3 marks]
- (ii) Briefly discuss three mechanisms of antibacterial action. [6 marks]
- (e) Using a suitable equation, explain how the presence of β -lactamase enzymes deactivate penicillins. [5 marks]

QUESTION FOUR (20 MARKS)

- (a) Briefly discuss two methods of synthesizing penicillin analogues. [4 marks]
- (b) Discuss the structure activity conclusions from the synthesis of penicillin analogues. [4 marks]
- (c) Draw the mechanism of the β -lactam ring opening under acidic conditions. [5 marks]
- (d) Briefly discuss the first two stages of the life cycle of a virus. [4 marks]
- (e) Give three reasons why proteins are good drug targets for antiviral drugs. [3 marks]