

UNIVERSITY OF RUHUNA

BACHELOR OF SCIENCE GENERAL DEGREE LEVEL III

(SEMESTER II) EXAMINATIONS- JANUARY 2022

Subject: Chemistry

COURSE UNIT: CHE 3232 (Pharmaceutical Chemistry) **TIME:** One and half (1.5) hours

Answer **three (03)** questions only

1. Answer **all** parts

a)

- (i) State four resources from which the information of crude drugs can be obtained
- (ii) "Nutraceuticals" and "Functional foods" .What do these terms mean?
- (iii) "Adulteration of crude drugs" is the main problem in crude drug industry. Briefly explain this.

(25 marks)

b)

- (i) State three main steps that need to be followed in order to get a new drug into the market.
- (ii) What are the processes that a drug is subjected in the body in order to give a therapeutic response?
- (iii) What is meant by "first pass effect"? Explain the disadvantages of that and how it can be avoided.

(35 marks)

c)

- (i) State three main mechanisms of drug transport into the site of action in the body. Give main characteristic feature of each transportation mechanism that you mentioned.
- (ii) How does a drug exert its effect or action?
- (iii) Explain the effect of agonist and antagonist in therapeutic response.
- (iv) What are ED_{50} and LD_{50} in pharmacology?
- (v) Explain briefly how structure of drug molecule affects on specificity of drug action.

(40 marks)

2. Answer **all** parts

a) Explain the following pertaining to pharmaceutical practice.

"Standard Buffer", "Official Buffer", and "Pharmaceutical aids".

(15 marks)

- b) Pharmacopoeias are recognized as the most authoritative sources of information on drug standards. In each pharmacopoeia the pharmacopoeial monographs are shown.
- (i) Briefly describe the word "drug monograph".
(05 marks)
 - (ii) List five entities which are included in the pharmaceutical drug monographs.
(10 marks)
- c) Limit tests are quantitative tests which are designed to detect and limit small quantities of impurities present in the pharmaceutical substances.
- (i) Describe the principal involved in the limit test for sulphates
(10 marks)
 - (ii) The limit test for iron in the given test sample is based on the formation of purple colour (by reaction of iron with thioglycollic acid in the presence of ammonium citrate). Discuss the roles of ammonium citrate and thioglycollic acid in this test.
(10 marks)
- d) The products formed in pharmaceutical degradation are unwanted compounds that can be generated during the manufacturing, transportation, and storage of drug products and can affect the efficacy of pharmaceutical products.
- (i) Explain the term "Pharmaceutical degradation".
(06 marks)
 - (ii) List major type of pharmaceutical degradation processes
(09 marks)
 - (iii) What are the methods-need to be followed if you have to stabilize pharmaceuticals from degradation?
(10 marks)
- e) Quality assurance plays a central role in determining the safety and efficacy of medicines.
- (i) What is the key to the design, development, standardization and quality control of medicinal products?
(5 marks)
 - (ii) What are the major areas that need to be considered when quality controlling of the pharmaceutical drugs?
(20 marks)

3. Answer **all** parts

a) Cancer is a leading cause of death worldwide, accounting for nearly 10 million deaths in 2020.

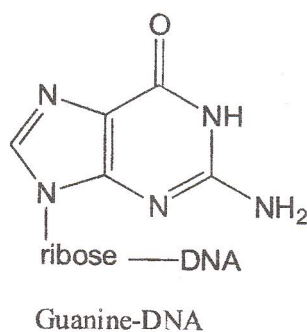
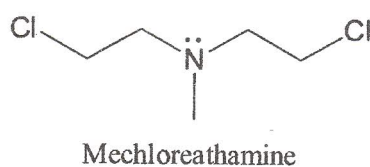
(i) Name and distinguish two types of tumors that can be occurred in human body.

(ii) Identify three characteristic features of cancer and briefly describe each character.

(iii) The therapeutic index of chemotherapeutic agents is considered to be low. Explain.

(30 marks)

b) Mechlorethamine is a nitrogen mustard comes under chemotherapeutic alkylating agents and its structure is given below



(i) Interpret the structural significance of the mechlorethamine to form its active form of drug upon reaching the site of action.

(ii) Using the given guanine of a DNA strand show how the alkylating agents binds to the DNA.

(iii) Discuss on chemical modifications that can be done to reduce its toxicity and reactivity.

(50 marks)

c) Briefly discuss the mechanism of action of antimetabolites, another class of chemotherapeutic agent.

(20 marks)

4. Answer **all** parts

a) Explain following related to drug metabolism.

(i) Xenobiotics

(ii) Biotransformation

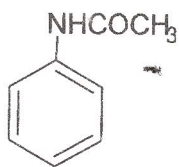
(iii) Mixed function oxidase

(15 marks)

b) Give three main chemical reactions that occur in the phase -I of drug metabolism

(15 marks)

- c) The structure of a simple drug, acetanilide, is shown below. Propose possible Phase-I and Phase-II reactions in its metabolism process.



Acetanilide

(15 marks)

- d) Angina is a symptom of coronary heart disease and caused by reduced blood supply to the heart.

(i) Giving chemical structures of organic nitrates discuss the vasodilating effect of organic nitrates.

(ii) Discuss the role of calcium channel blockers as anti-anginal agents

(30 marks)

- e) Angiotensin-I, a decapeptide formation is vital in maintaining regular blood pressure under normal physiological conditions.

(i) Schematically represent the function of angiotensin-I activity in renin-angiotensin system for regulation of blood pressure.

(ii) Discuss the role of ACE (angiotensin converting enzymes) inhibitors as anti-hypertension agents

(25 marks)

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