

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS.

**THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE  
OF BACHELOR OF SCIENCE IN BIOCHEMISTRY**

**BIOC 222: XENOBIOTICS METABOLISM AND DRUG DEVELOPMENT**

**STREAMS: BS.c (BIOC)**

**TIME: 2 HOURS**

**DAY/DATE: WEDNESDAY 10/04/2019**

**2.30 P.M - 4.30 P.M.**

**INSTRUCTIONS:**

- Answer Question ONE and any other TWO Questions
- Do not write anything on the question paper

**QUESTION ONE**

- (a) Distinguish between the following; [4 Marks]  
(i) Bioavailability vs Bioequivalence  
(ii) Pharmacokinetics vs pharmacodynamics
- (b) Explain the main types of cellular toxicity caused by xenobiotics exposure. [5 Marks]
- (c) Benzene compound is typical xenobiotic. Explain giving an illustration the oxidation of Benzene in Phase I reactions. [5 Marks]
- (d) Describe glutathione conjugation and its significance in xenobiotic metabolism. [5 Marks]
- (e) Explain the mercapturic acid pathway as an example of phase III reaction involved in the excretion of the xenobiotics from the cell. [6 Marks]
- (f) Explain five possible functional effects of drug metabolism giving specific type of drug involved. [5 Marks]

**QUESTION TWO**

- (a) Discuss phase II reaction of xenobiotics and glucuronidation reaction of phenol as an example. [10 Marks]
- (b) Discuss the factors that influence the rate and extent of drug absorption in the body. [10 Marks]

**QUESTION THREE**

- (a) Explain carcinogenesis and teratogenesis as examples of toxicities associated with xenobiotics. [10 Marks]
  
- (b) Bioactivation of drugs to toxic metabolites is one of the mechanisms involved in drug toxicity. Discuss with an aid of a diagram the classical example of analgesic acetaminophen. [10 Marks]

**QUESTION FOUR**

Discuss the clinical trials involved to evaluate the safety and efficacy of new drug under the following subheadings;

- (i) Phase I clinical trials
- (ii) Phase II clinical trials
- (iii) Phase III clinical trials
- (iv) Phase IV clinical trials [20 Marks]

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