

THE OPEN UNIVERSITY OF SRI LANKA
CENTRE FOR ENVIRONMENTAL STUDIES AND SUSTAINABLE DEVELOPMENT
M.Sc. IN ENVIRONMENTAL SCIENCE 2017 /2018
ECO TOXICOLOGY AND POLLUTION MANAGEMENT – CYPA610/ NEP2223
FINAL EXAMINATION



DURATION: Three (03) Hours

Date: 01.12.2018

Time: 9.30 a.m. – 12.30 p.m.

Answer any **four (04)** questions out of six

- 1 a. Name five natural air pollutants. **(20 marks)**
- b. Explain the atmospheric and health effects of natural air pollutants stated above. **(80 marks)**
2. a. Describe the mechanisms involved in following processes in transporting toxicants through the cell and organ membranes in biological organisms.
- i. Simple diffusion
- ii. Facilitated diffusion
- iii. Active transport
- iv. Receptor-mediated uptake **(100 marks)**
3. Describe the factors considered in selecting a test organism for a laboratory toxicity test. **(100 marks)**
4. a. Describe the following terms as applied in chemical toxicology.
- i. Threshold and Non threshold dose
- ii. Detoxification process
- iii. Reactive metabolites
- iv. Response **(16 marks)**

- b. The dose response relationship is the most fundamental and essential concept in toxicology.
- Name the **two (02)** main classifications of dose response curves?
 - What is the major difference between them?
 - Discuss **three (03)** ways that chemical mixture can interact. Draw a dose response curve to show the interaction in each case.

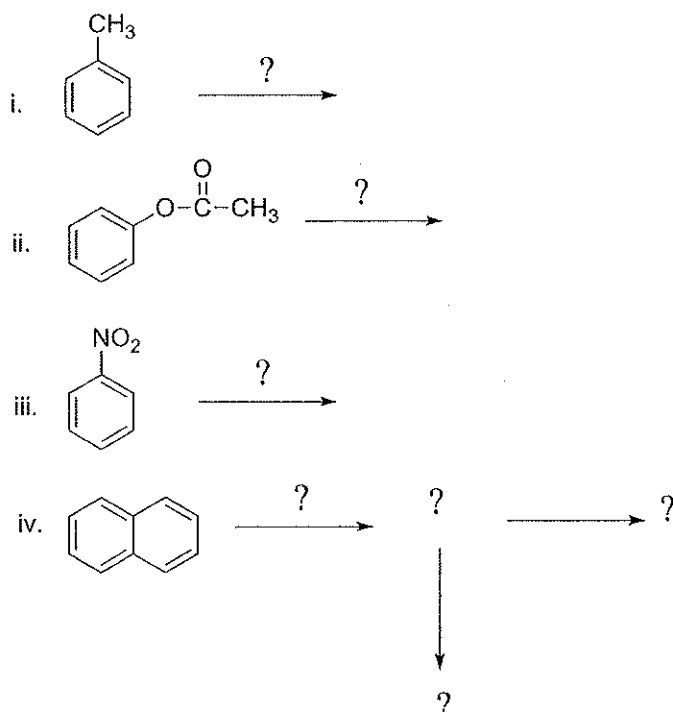
(24 marks)

- c. i. Compare Phase I and Phase II reactions in terms of enzyme and type of reaction involved.

(12 marks)

- d. What metabolite would be formed when the following toxicants undergo phase I reaction? Indicate the enzyme involved in each case.

(28 marks)



e. Briefly describe the biotransformation of vinylchloride ($\text{CH}_2 = \text{CHCl}$) by indicating the enzyme involved, and reactive metabolite. (20 marks)

5. a. Name **four (04)** toxic heavy metals. (10 marks)

b. Discuss how **one** of the above mentioned heavy metals damage proteins. (20 marks)

c. Briefly explain how the genetic code determines the primary structure of proteins. (30 marks)

d. Giving examples discuss the **three (03)** mechanisms involved in inhibition of neurotransmission. (40 marks)

6. a. Define the terms 'hazard' and 'risk.' (20 marks)

b. Discuss the hazards and risks associated with **any three (03)** of the following occupations.

- i. Executive in the banking sector
- ii. Paddy farmer
- iii. Heavy vehicle driver
- iv. Laboratory worker

(60 marks)

c. Discuss control measures to minimize risks for **one (01)** of the three occupations you selected in the above question (6.b.). (20 marks)
