The Open University of Sri Lanka

M.Sc. in Environmental Science – 2015/16

Eco Toxicology and Pollution Management- NEP2223 – Level 8

Final Examination

Duration: Three (03) Hours

Date: 12th November 2016 **Time: 9.30 a.m. – 12.30 p.m.**

ANSWER **ANY FOUR (04)** QUESTIONS.

If more than four questions are answered only first four will be marked.

1. a. Explain the following terms used in eco toxicology.
   i. LD50
   ii. Effective concentration
   iii. Infective dose
   iv. Acute toxicity
   v. Chronic toxicity **(10 marks)**

   b. Describe the types of processes involved in transformation of toxicants in the environment.

   (90 marks)

2 Describe the factors that influence the rate of absorption of toxicants in the gastrointestinal tract. **(100 marks)**

3. a. Describe different types of laboratory toxicity test design methods.

   (45 marks)

   b. Briefly describe the advantages and disadvantages of the above described design methods. **(55 marks)**

4. a. Describe the following terms as applied in chemical toxicology.
   i. Xenobiotic compounds
   ii. Detoxification process
   iii. Effective dose

iv. Bio activation
v. Potentiation **(15 marks)**

b. i. Describe the nature and important features of a dose response curve.

ii. Draw dose response curves showing two toxicants (A, B) that are synergistic.

(30 marks)

c. Discuss Phase I and Phase II reactions involved in the metabolism of xenobiotics. **(35 marks)**

d. Methanol (CH_3OH) is a poison while ethanol (CH_3CH_2OH) at low concentrations is a recommended drink. Justify this statement. **(20 marks)**

5. a. List the biological Importance of
i. Lipids
ii. Proteins **(10 marks)**

b. i. Explain the features of secondary structures of proteins.
ii. List the amino acids that can destruct/destabilize the secondary structures of proteins.

(20 marks)

c. A segment of single strand of DNA is given below.

A T C G T T A T C G C C

i. Write the complementary DNA strand.
ii. Write the complementary RNA strand.
iii. List **Two (02)** chemicals that cause DNA damage.
iv. List **Two (02)** enzymes involved in DNA repair mechanisms.

(30 marks)

d. i. Outline the sequence of possible events following exposure of cells to a chemical carcinogen. **(15 marks)**

e. Explain the following
   i. Proto-oncogene
   ii. Tumor suppressor gene **(10 marks)**

f. i. Explain the mechanisms of cadmium toxicity on the kidney
   ii. List the essential minerals that can reduce the absorption of heavy metals/cadmium. **(15 marks)**

6. a. Discuss the relationship between work and health.

(20 marks)

b. Give **two (02)** possible reasons for each of the following statements.

   i. Administrative and engineering control measures should be considered first before enforcing the use of personal protective equipment.

   ii. Pesticides should be kept under lock and key.

   iii. Good housekeeping practices prevent accidents in the work place.

   iv. Workers should be accessible to Material Safety Data Sheets (MSDS) where chemicals are used.

(80 marks)

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