



UNIVERSITI KUALA LUMPUR  
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

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**FINAL EXAMINATION**  
**MARCH 2025 SEMESTER**

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COURSE CODE : HGD20703  
COURSE TITLE : INTRODUCTION TO ENVIRONMENTAL TOXICOLOGY  
PROGRAMME NAME : DIPLOMA IN ENVIRONMENTAL HEALTH  
DATE : 30 JUNE 2025  
TIME : 2:00PM - 5:00PM  
DURATION : 3 HOURS



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**INSTRUCTIONS TO CANDIDATES**

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1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of TWO sections.
4. Section A consist 25 MCQ or EMQ questions. Answer ALL questions.
5. Section B consist of four questions. Answer THREE (3) questions only.
6. Please write your answer on the answer booklet provided.
7. Please answer all questions in English only.
8. Please answer MCQ/EMQ questions using OMR sheet.  *Tick if applicable*
9. Refer to the attached Formula/ Appendies.  *Tick if applicable*

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THERE ARE 10 PAGES OF QUESTIONS INCLUDING THIS PAGE

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## SECTION A (Total: 25 marks)

Answer ALL questions.

Please use the objective answer sheet provided.

1. The correct sequence of toxicokinetic phases a xenobiotic may pass through is \_\_\_\_\_.
  - A. formulation --> absorption -->metabolism --> excretion
  - B. disintegration --> absorption -->elimination --> expiration
  - C. administration --> inhalation -->absorption --> excretion
  - D. absorption --> distribution --> metabolism -->excretion
  
2. Which of the following is NOT a protein target for toxicant binding?
  - A. Ion channels.
  - B. Enzymes.
  - C. Receptors.
  - D. Deoxyribonucleic acid (DNA).
  
3. Chronic and acute exposure are typically estimated in terms of \_\_\_\_\_.
  - A. susceptibility
  - B. genetics
  - C. population
  - D. doses by exposure rate
  
4. Which of the following is TRUE regarding the dose-response relationship?
  - A. The dose does not induce any response.
  - B. The dose that elicits a toxic response.
  - C. Dose exhibits an 'all or none' response.
  - D. The response is directly proportional to the dose of a substance.

5. The \_\_\_\_\_ system(s) enable a cancer cell to travel during metastasis.
- A. circulatory and lymphatic
  - B. nervous and lymphatic
  - C. musculoskeletal and lymphatic
  - D. musculoskeletal and circulatory
6. The compound responsible for the killing action of pesticides is called \_\_\_\_\_.
- A. killing agent
  - B. active ingredient
  - C. lethal factor
  - D. toxic factor
7. Which of the following is a route of entry for volatile organic compounds (VOCs) into human body?
- A. Ingestion.
  - B. Inhalation.
  - C. Exhalation.
  - D. Skin absorption.
8. The accumulation of a toxic chemical as it moves up the food chain is known as \_\_\_\_\_.
- A. both biomagnification and bioaccumulation
  - B. bioaccumulation
  - C. neither bioaccumulation nor biomagnification
  - D. biomagnification

9. Which of the following gases DOES NOT contribute to the greenhouse effect?
- A. Carbon dioxide.
  - B. Methane.
  - C. Water vapour.
  - D. Nitrogen dioxide.
10. Which of the following statements BEST describes No Observed Adverse Effect Level (NOAEL)?
- A. The condition of experimental animals when no adverse effect can be observed.
  - B. A condition where adverse effects exist, but are hard to observe.
  - C. The maximum dose at which the toxicant shows no signs of toxicity.
  - D. The maximum dose of a chemical caused the death, hence no other adverse effect was observed.
11. Ecotoxicology is the study of \_\_\_\_\_ interactions between organisms and the environment.
- A. biological
  - B. physical
  - C. chemical
  - D. thermal
12. The primary goal of health risk assessment is to \_\_\_\_\_.
- A. minimize or control identified health risks
  - B. predict future health outcomes
  - C. maximize personal wellness
  - D. eliminate all health risks

13. Risk from a public health perspective is BEST described as \_\_\_\_\_.
- A. a bad outcome is assured and its mechanism is well-understood
  - B. the undesirable endpoint is reached
  - C. likelihood of an unwanted outcome combined with uncertainty of when it will occur
  - D. a possibility of a bad outcome
14. Which is TRUE about the LD<sub>50</sub>?
- A. 50% of the dose of a substance that can kill an animal.
  - B. Dose of a substance to which 50% of animals do not show any response.
  - C. Dose of a substance that kills 50% of animals exposed.
  - D. Dose of a substance that can kill 50 animals.
15. What is carcinogenesis?
- A. Cell cycle arrest.
  - B. Programmed cell death.
  - C. Transformation of a normal cell into a cancerous one.
  - D. Abnormal growth of benign tissue.
16. Which of the following would be considered a detoxication biotransformation process?
- A. Formation of redox-active reactants.
  - B. Conjugation with glucuronic acid.
  - C. Formation of electrophiles.
  - D. Formation of free radicals.

17. Agonists affect receptor molecules by \_\_\_\_\_.
- A. altering its amino acid sequence
  - B. denaturing the receptor protein
  - C. inducing the covalent bond formation
  - D. altering its folding or alignment of subunits
18. 'Itai-itai' disease is caused by\_\_\_\_\_.
- A. mercury
  - B. cadmium
  - C. lead
  - D. copper
19. What is the smallest particle size filtered by the nasal passage?
- A. 1 millimeter.
  - B. 5 micrometer.
  - C. 500 micrometer.
  - D. 10 micrometer.
20. Which of the following is a non-point source of water pollution?
- A. Electronics manufacturers.
  - B. Urban and suburban lands.
  - C. Factories.
  - D. Sewage treatment plants.

21. What is the first step in a risk assessment?
- A. Dose-response assessment.
  - B. Risk characterization.
  - C. Exposure assessment.
  - D. Hazard identification.
22. Which of the following is an example of an organic solvent?
- A. Carbon dioxide.
  - B. Water.
  - C. Ethanol.
  - D. Sodium chloride.
23. Which type of dose-response curve shows an all-or-nothing response in a population?
- A. Linear dose-response curve.
  - B. Graded dose-response curve
  - C. Logarithmic dose-response curve.
  - D. Quantal dose-response curve.
24. The following statements are TRUE regarding biotransformation EXCEPT
- A. The liver is the most active organ in the biotransformation of toxins.
  - B. The kidney plays a major role in eliminating toxicant from the body.
  - C. Toxins must be transformed into a more lipid-soluble form before they can be excreted from the body.
  - D. The lungs play a minor role in ridding the body of certain toxins.

25. Which of the following scenarios would result in the most damaging effects of toxicant exposure in humans?
- A. A lipophilic chemical via inhalation route.
  - B. A lipophilic chemical via dermal route.
  - C. A hydrophilic chemical via inhalation route.
  - D. A hydrophilic chemical via oral route.

**SECTION B (Total: 75 marks)**

Answer **THREE (3)** questions only.

Please use the answer booklet provided.

**Question 1**

Teratogens refer to any agents that cause damage to the fetus during the prenatal period. The defect can be seen physically and it has the potential to affect the neurobehavioral of a child. Discover **FIVE (5)** key characteristics of teratogens and provide two examples of environmental teratogens, explaining their effects on fetal development

(25 marks)

**Question 2**

With the aid of a dose-response curve, illustrate a scenario in which Chemical A is more potent and more efficacious than Chemical B. In your answer, include a clearly labeled graph comparing both chemicals and discuss how potency and efficacy are represented on the curve.

(25 marks)

**Question 3**

Certain substances in the environment have been identified to affect cellular and genetic functions, potentially leading to mutation or cancer development. Examine **FIVE (5)** differences between mutagens and carcinogens.

(25 marks)

**Question 4**

In environmental toxicology, risk assessment is an essential process to evaluate the potential adverse effects of chemical pollutants on human health and the environment. Apply your knowledge to describe in detail the four main steps involved in risk assessment. For each step, explain its purpose, key activities carried out, and its significance in ensuring environmental safety and public health. Support your answer with relevant examples where appropriate.

(25 marks)

END OF EXAMINATION PAPER

