UNIVERSITI KUALA LUMPUR
INSTITUTE OF MEDICAL SCIENCE TECHNOLOGY

FINAL EXAMINATION

MARCH 2025 SEMESTER

COURSE CODE	:	HGB30403
COURSE TITLE	:	ENVIRONMENTAL HEALTH EPIDEMIOLOGY
PROGRAMME NAME	:	BACHELOR OF ENVIRONMENTAL HEALTH (HONS)
DATE	:	03 JULY 2025
TIME	:	2:00PM - 5:00PM
DURATION	:	3 HOURS

INSTRUCTIONS TO CANDIDATES

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 ONE sections.
4. Section A consist of five questions. Answer FOUR (4) questions only.
5. Please write your answer on the answer booklet provided.
6. Please answer all questions in English only.
7. Refer to the attached Formula/ Appendies. ☐ *Tick if applicable*

THERE ARE 5 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 100 marks)

Answer FOUR (4) questions.

Please use the answer booklet provided.

Question 1

A sudden increase in gastroenteritis cases was reported in a coastal town over a 10-day period, affecting more than 60 residents. Preliminary investigation revealed that most affected individuals had recently consumed water from a local untreated well.

(a) As an environmental health epidemiologist, analyze how you would investigate this outbreak.

(10 marks)

(b) Outline the steps you would take to identify the source, analyze the data, and recommend public health actions.

(15 marks)

Question 2

Residents in a rural community located near an open burning landfill have reported increased cases of chronic cough, asthma attacks, and eye irritation. As an environmental health epidemiologist, you are asked to investigate the potential link between exposure to air pollutants from the landfill and respiratory health outcomes.

(a) Compare the suitability of conducting a cross-sectional study versus a prospective cohort study to assess this issue.

(10 marks)

(b) Recommend the most appropriate study design based on practical considerations and explain the justification.

(5 marks)

(c) Describe the key components (population, exposure, outcome, time frame) of the study you would implement.

(10 marks)

Question 3

In a residential area near an industrial zone, 150 cases of respiratory illness were reported over the past year. Most of the affected individuals were children under 12 and elderly persons above 60. The highest number of cases occurred in households located within 1 km of the factory, especially during the dry season from June to August.

(a) Using the descriptive epidemiology approach, analyze the data based on person, place, and time.

(15 marks)

(b) Analyse the patterns, and discuss how can these patterns support environmental health interventions?

(10 marks)

Question 4

In a rural community located near a pesticide-spraying agricultural area, 45 out of 500 residents were diagnosed with neurological symptoms over the past year. In a nearby village with similar demographics but no pesticide exposure, only 5 out of 500 people reported similar symptoms.

(a) Analyze whether there is an association between pesticide exposure and neurological symptoms. Please include calculation in your explanation.

(10 marks)

(b) Analyse whether this association implies causality by using appropriate criteria ie Bradford Hill.

(10 marks)

(c) Identify how environmental health epidemiologists could confirm a causal relationship.

(5 marks)

Question 5

A city deployed IoT-based air quality sensors across urban residential areas to monitor $PM_{2.5}$ exposure. Data over one year showed that in areas where average $PM_{2.5}$ levels exceeded 35 μg/m³, asthma-related hospital admissions reached 40 per 1,000 residents. In comparison, areas with $PM_{2.5}$ below 15 μg/m³ recorded only 10 admissions per 1,000.

(a) Analyze whether this data suggests an association between $PM_{2.5}$ exposure and asthma admissions. Please include relevant calculations in your explanation.

(10 marks)

(b) Analyse whether the association implies causality using suitable criteria in Bradford Hill criteria.

(10 marks)

(c) Identify how IoT technologies can support environmental epidemiologists in evaluating exposure-disease relationships.

(5 marks)

END OF EXAMINATION PAPER