AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF PUBLIC HEALTH

DEPARTMENT OF COMMUNITY HEALTH

MASTER OF PUBLIC HEALTH

END OF SEMESTER EXAMINATION 2026

UNIT CODE: MPH713 MSR713 **UNIT NAME:** PRINCIPLES OF EPIDEMIOLOGY
DATE: **ARPIL 2026**
TIME: Three Hours **Start:** 17:30 Hours **Finish** 20:30 Hours

INSTRUCTIONS

1. This exam is marked out of 100 marks
2. This Examination comprises TWO Sections

Section A: Compulsory Question (25 marks)
Section B: Long Answer Questions (75 marks)

SECTION A: COMPULSORY (25 Marks)

Short Answer Questions (Each question carries 5 marks)

1. Explain how a change in environmental factors can shift the balance toward a disease outbreak (5 marks)
2. Using an example of a chronic disease, explain how primary, secondary, and tertiary prevention strategies are applied in public health (5 marks)
3. Describe three strategies used to control for confounding in research (5 marks)
4. Differentiate public health screening from clinical diagnostic testing as applied in Epidemiology while providing practical examples (5 marks)
5. Explain why latent period is important for the success of a screening program (5 marks)

SECTION B (Set of 5 Questions)

ANSWER <u>ANY THREE (3)</u> QUESTIONS (75 Marks)

Long Answer Questions

1. You have been tasked with investigating a suspected link between a rare environmental toxin and a specific type of cancer.
    a) Select an appropriate study design to be used (2 Marks)
    b) Justify the study design as the best fit (5 Marks)
    c) Discuss the advantages of using this study design (18 Marks)

2. The Ministry of Health in a middle-income country is introducing a new test for national screening program for "Condition X," a non-communicable metabolic disorder. Condition X is asymptomatic in its early stages but leads to severe renal failure if left untreated. A standard test for condition X has identified 200 cases. A new, low-cost finger-prick test correctly identified 150 cases and wrongfully identified 20 cases. The population of the country is 5,000 people. Using a 2 X 2 table, calculate the following
    a) Sensitivity of the test method (5Marks)
    b) Specificity of the test method (5Marks)
    c) Positive predictive value of the test method (5Marks)
    d) Negative predictive value of the test method (5Marks)

3. Using the natural history of a disease, discuss five stages where preventive measures can be put in place to control transmission of an infectious disease (25 marks)
4. A study on the association between smoking and lung cancer yielded the following results

	Lung Cancer		
Smoking	Yes	No	Total
Yes	70	6930	7,000
No	3	2,997	3,000
Total	73	9,927	10,000

    a) Calculate the Relative Risk of developing lung cancer, given exposure to smoking (20 Marks)
    b) Interpret your answer (5 Marks)
5. In the dry season of 2024, a rural district reported a sudden rise in severe respiratory illness. Within a three-month window, 120 cases were identified. Preliminary data suggests that cases began rising sharply two weeks after an unusually heavy dust storm followed by a brief period of intense humidity. About 85% of cases are clustered within a 5-mile radius of a new large-scale highway construction project that involves significant soil excavation. The majority of cases are males aged 20–45, specifically those employed in outdoor manual labor. However, a secondary cluster has emerged among elderly residents (ages 70+) living in a nursing home downwind from the construction site.
    a) Construct a theoretical Epidemic Curve for this outbreak (5 marks)

b) Explain how the "Time" component helps to distinguish between a point-source, continuous-source, or propagated outbreak (10 Marks)
c) Discuss how the incubation period of severe respiratory illness can be used to prevent future episodes (lag between the dust storm and the onset of symptoms) (10 Marks)