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POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MSc (BIOMEDICAL INFORMATICS) SEMESTER II EXAMINATION
MARCH 2026

Date:- 19th March 2026

Time:- 1.30 p.m. - 3.00 p.m.

SEQ PAPER

Answer **all three (03)** questions.

Answer each question in a separate book.

Module 6 - Basic Epidemiology and Statistics

1. Sri Lanka is strengthening its disease surveillance and data-driven decision-making capacity following recent public health challenges including dengue outbreaks and leptospirosis.
 - 1.1. Define the term “Disease Surveillance” and describe its key components in the Sri Lankan context. (15 marks)
 - 1.2. List five (05) essential services of public health and briefly describe two (02) of them with examples from Sri Lanka. (20 marks)
 - 1.3. A dataset of dengue cases reported in a district is assumed to follow a normal distribution.
 - 1.3.1. List three (03) properties of a normal Gaussian distribution. (15 marks)
 - 1.3.2. The mean number of weekly dengue cases is 120 with a standard deviation of 20. Calculate the value, above which the top 2.5% of weekly case counts fall. (20 marks)
 - 1.4. Discuss how big data analytics and digital surveillance tools (e.g., DHIS2, mobile reporting, GIS mapping) can improve epidemic response in Sri Lanka. (30 marks)

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Module 8 - Public Health Informatics

2. The Ministry of Health of Sri Lanka plans to integrate multiple digital health systems including eIMMR, DHIS2 and hospital EMRs into a unified health information ecosystem.
 - 2.1. Briefly describe the challenges associated with implementing electronic public health information systems in Sri Lanka. (20 marks)
 - 2.2. Discuss the concept of interoperability in health information systems, referring to different types of interoperability and the role of health data standards. Use examples where relevant. (40 marks)
 - 2.3. Compare and contrast clinical information systems and public health information systems, including their roles in decision-making. (40 marks)

Module 9 - Bioinformatics

3. A tertiary care hospital in Sri Lanka is planning to introduce Whole Exome Sequencing (WES) for cancer diagnostics and rare disease identification.
 - 3.1. Define a primary biological database and give two (02) examples commonly used in bioinformatics. (10 marks)
 - 3.2. Describe the key attributes required when designing a genomic data repository for WES data. (20 marks)
 - 3.3. Explain how bioinformatics tools and databases can be used to interpret genetic variants identified through WES. (40 marks)
 - 3.4. Write notes on the following:
 - 3.4.1. DNA sequence alignment tools (10 marks)
 - 3.4.2. Personalized genetic testing in clinical practice (10 marks)
 - 3.4.3. Role of generative AI tools in genomics (10 marks)