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POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MSc (BIOMEDICAL INFORMATICS) END OF SEMESTER I
EXAMINATION – SEPTEMBER 2026

Date:- 25th September 2026

Time:- 1.30 p.m. – 3.00 p.m.

MODULE I

Mathematics for Computing and Object – Oriented Programming

1. The Ministry of Health plans to develop an information system to allocate prospective Intern Medical Officers to training hospitals. Each applicant has a unique identifier, a merit rank and an ordered list of preferred hospitals. Each hospital has a specified number of available internship positions. Applicants are considered in ascending order of merit rank: rank 1 is considered first. Applicants are allocated to hospitals according to their order of preference that has at least one remaining vacancy. A hospital with no remaining vacancies cannot receive further allocations. Each applicant should receive only one allocation.
 - 1.1. Distinguish between ‘class’ and ‘object’. (10 marks)
 - 1.2. Define an example ‘InternMedicalOfficer’ Class with appropriate properties (attributes) and methods, explaining their purposes. (20 marks)
 - 1.3. Write pseudocode to implement the allocation process. Your algorithm must clearly demonstrate iteration (looping) and selection (conditional statements). (40 marks)
 - 1.4. Compare object-oriented programming and procedural programming in relation to program organisation, data handling, reuse and maintenance. (30 marks)

Math Gm
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MODULE 4

Networking, Computer Hardware, Operating Systems and Application Packages

2. A Base Hospital plans to introduce an Electronic Medical Record (EMR) system connecting its outpatient department, wards, laboratory and pharmacy. Authorised staff will also require secure access from outside the hospital.
- 2.1. List the seven layers of the OSI model. (20 marks)
 - 2.2. Describe the functions of a switch, router and firewall in the proposed hospital network. (20 marks)
 - 2.3. Compare star and bus network topologies and recommend a suitable topology for this hospital, giving reasons. (30 marks)
 - 2.4. Compare the advantages and disadvantages of open-source and proprietary software for the above system. (30 marks)

MODULE 5

Software Engineering and Software Management

3. A hospital plans to develop an electronic referral system to replace its paper-based process. The system will allow medical officers to submit referrals, schedule appointments, and track referral status.
- 3.1. Distinguish between functional and non-functional requirements, giving two (02) examples of each for the proposed system. (30 marks)
 - 3.2. Compare Agile and Waterfall software development methodologies. Recommend a suitable methodology from above two for the proposed system with justification. (40 marks)
 - 3.3. Outline how you would conduct User Acceptance Testing (UAT) for the proposed system, including participants, test scenarios and acceptance criteria. (30 marks)