UNIVERSITY OF JAFFNA, SRI LANKA
FACULTY OF ALLIED HEALTH SCIENCES
SECOND YEAR SECOND SEMESTER EXAMINATION IN BScHons(MLS)-2023
MLSCB 2235 CLINICAL BIOCHEMISTRY I

PAPER II

Date: 09.06.2025 **Time: 2 Hours**

ANSWER All SIX QUESTIONS
ANSWER EACH QUESTION IN A SEPARATE ANSWER BOOK

1. A urine sample from a 60-year-old man was submitted to the Chemical Pathology laboratory for routine urinalysis. The sample container details indicate that the sample was collected at 7:00 a.m. and received at the reception counter at 6:00 p.m.

   1.1 List three (03) steps that should be followed upon receiving this sample at the reception counter. (10 Marks)

   1.2 By mistake, the sample was sent to the laboratory. A junior MLT analyzed and reported the following findings to the senior MLT before releasing it.

Colour	: Dark yellow	White blood cells	: nil
Clarity	: Turbid	Red blood cells	: 1-2/ hpf
Specific gravity	: 1.030	Epithelial cells	: Squamous epithelial cells Few
pH	: 9.0	Casts	: nil
Protein	: ++	Crystal	: nil
Glucose	: Nil	Organisms	: ++
Nitrite	: +		
Blood	: trace		

   1.2.1 How could the ward have prevented this preanalytical error? (10 Marks)

   1.2.2 State the possible abnormalities in this report and explain the causes for each abnormality. (30 Marks)

   1.2.3 Mention one (01) confirmatory test for urine protein. (10 Marks)

   1.3 Briefly describe the correct handling and storage of urine reagent strips. (40 Marks)

2.

2.1 A 45-year-old woman with haemoglobin concentration of 9 g/dL was referred to the haematological clinic for further investigations. She was suspected of having iron deficiency anaemia.

2.1.1 List five (05) causes for iron deficiency. (10 Marks)

2.1.2 List ten (10) laboratory findings in iron deficiency anaemia and explain the expected changes for each test. (30 Marks)

2.2 Briefly explain the patient preparation, special precautions to be taken when collecting the sample, sample type, and sample container for the following tests. (No need to include detailed phlebotomist procedure)

2.2.1 Serum iron (30 Marks)

2.2.2 Urine porphobilinogen (30 Marks)

3.

3.1 A 35-year-old man who is a chronic alcoholic presented to the Emergency Department with severe abdominal pain, fever and vomiting. On examination, he was found to have jaundice and was diagnosed with acute hepatitis.

3.1.1 List five (05) causes for acute hepatitis other than chronic alcohol consumption. (10 Marks)

3.1.2 List five (05) basic laboratory investigations that can be done in the Chemical Pathology laboratory for this patient and mention the expected findings. (30 Marks)

3.2 A 45-year-old man presented to the Emergency Department with sudden onset of severe upper abdominal pain radiating to the back, associated with nausea and vomiting. On examination, he was febrile, tachycardic, and had a tender epigastrium. He was suspected of having acute pancreatitis.

3.2.1 List five (05) causes for acute pancreatitis. (10 Marks)

3.2.2 Mention five (05) tests with expected findings that can be done in the Chemical Pathology laboratory to diagnose and monitor this condition. (30 Marks)

3.2.3 Compare and contrast the utility of the two main enzymes in diagnosing acute pancreatitis. Include sensitivity, specificity, and limitations of both enzymes as diagnostic parameters. (20 Marks)

4. Buffers are the first line defense against acid overload in the body.

   4.1 Define the term buffer and explain its importance in maintaining the acid-base balance of the body. (20 Marks)

   4.2 List five (05) buffer systems in the human body. (20 Marks)

   4.3 List four (04) causes each for metabolic acidosis and metabolic alkalosis. (20 Marks)

   4.4 List five (05) uses of buffer in clinical laboratories. (10 Marks)

   4.5 Discuss the potential reasons why an improperly prepared buffer could affect clinical laboratory test results. (30 Marks)

5 A 55-year-old obese man visited the outpatient clinic with complaints of excessive thirst, frequent urination, and recent unexplained weight loss. His fasting plasma glucose was 12.8 mmol/L, and he was diagnosed to have type II diabetes mellitus.

   5.1 List five (05) risk factors for type II diabetes mellitus. (10 Marks)

   5.2 Outline the laboratory criteria for diagnosing diabetes mellitus. (20 Marks)

   5.3 Compare and contrast the uses, advantages, and limitations of HbA1c and fasting plasma glucose (FPG) in the diagnosis and monitoring of diabetes. (20 Marks)

   5.4 List five (05) laboratory investigations with expected changes to identify the complications of diabetes mellitus. (20 Marks)

   5.5 Write short notes on urine microalbumin. (30 Marks)

6. A 50-year-old man with a family history of cardiovascular disease came for a full-body checkup. He was advised to do the lipid profile and few other tests.

   6.1 Briefly explain the preanalytical considerations that should be followed for a lipid profile test. (30 Marks)

   6.2 After performing the test, his test results for lipid profile were as follows.

Test	**Results**	**Desirable range**
Total cholesterol	6.50 mmol/L	<5.00 mmol/L
Triglycerides	2.45 mmol/ L	<1.69 mmol/L
HDL Cholesterol	1.34 mmol/L	≥1.55 mmol/L

6.2.1 Name the equation that is used to calculate LDL cholesterol value. (10 Marks)

6.2.2 Calculate the LDL cholesterol value. (10 Marks)

6.2.3 List two (02) instances where the equation mentioned in 6.2.1 is not applicable. (10 Marks)

6.2.4 List three (03) methods that can be used to measure the LDL-Cholesterol in the instances mentioned in 6.2.3. (20 Marks)

6.2.5 Mention four (04) diseases that can lead to secondary dyslipidemia. (20 Marks)