UNIVERSITY OF JAFFNA, SRI LANKA

FACULTY OF ALLIED HEALTH SCIENCES

FOURTH YEAR FIRST SEMESTER EXAMINATION IN BSc Hons (MLS)-2022

MLSCB 4135 CLINICAL BIOCHEMISTRY II

Date: 19.05.2022 **Time: 3 hours**

ANSWER ALL SIX QUESTIONS.

1.

1.1

1.1.1 Explain, how you will give advice on 24 hours collection of urine to a patient. (20 marks)

1.1.2 List **five (05)** analytes that are tested in 24 hours urine and indicate **one (01)** preservative which is used in the 24 hours collection for each analyte. (20 marks)

1.2

1.2.1 Describe the care in handling and the technique of using urinary strip (dipstick) method for urinalysis. (15 marks)

1.2.2 List **five (05)** types of casts and **five (05)** types of crystals seen in urine when doing urine for microscopy in a clinical laboratory. (20 marks)

1.2.3 Describe the key features with the help of diagrams to identify and differentiate the casts and crystals from each other listed in **1.2.2** (25 marks)

2.

2.1 A 35 years old man presented with episodic palpitations and high blood pressure. He was suspected to have phaeochromocytoma

2.1.1 List **two (02)** blood and **two (02)** urine investigations that can be used in screening a patient with Phaeochromocytoma. (20 marks)

2.1.2 List the dietary precautions to be taken in collection of **one (01)** of the urinary analyte, mentioned in 2.1.1 (10 marks)

2.2. A 45 years old woman, presented with features of hypocalcaemia to the Accident & Emergency unit. The past medical history reveals frequent admissions due to same features.

2.2.1 List **four (04)** causes of chronic hypocalcaemia. (20 marks)

2.2.2 List **three (03)** biochemical and **one (01)** hormone investigations that can be done in this patient, and mention the expected changes in each one of them. (20 marks)

2.2.3 **Mention one (01)** method used in a clinical laboratory for the hormone assay mentioned in 2.2.2 (05 marks)

2.2.4 Explain the preparation, sample collection, processing and storage of the hormone sample that is analyzed by the method given in 2.2.3 (25 marks)

3. Quality control is a vital part of laboratory quality assurance system.

3.1 Name the **two (02)** main quality control programmes used in a clinical laboratory. (10 marks)

3.2 Mention the laboratory phase which is checked by quality control programmes. (05 marks)

3.3 Discuss the steps involved in introducing internal quality control programme in a newly established Chemical Pathology laboratory. (20 marks)

3.4 Discuss the ideal qualities you will look into when purchasing the Internal Quality Control materials. (30 marks)

3.5 Mention the type of pipette you will use for the reconstitution of lyophilized Quality control material and list **two (02)** important pipette maintenance factors to be adhered to. (20 marks)

3.6 Mention the storage conditions and maximum storage time of the following quality control materials:

3.6.1 Unopened Lyophilized assayed clinical chemistry control.

3.6.2 Reconstituted aliquotes of assayed clinical chemistry control.

3.6.3 Liquid urine assayed chemistry control. (15 marks)

4.

4.1

4.1.1 List **two (02)** indications for cerebrospinal fluid (CSF) analysis. (10 marks)

4.1.2 List **two (02)** important features of the collection tubes/ bottles used in CSF analysis. (10 marks)

4.1.3 List **five (05)** routine tests that are done on CSF sample in hospital laboratories. (10 marks)

4.1.4 Give **one (01)** important reason behind analyzing the CSF sample as STAT sample in Chemical Pathology laboratory. (05 marks)

4.1.5 How will you preserve the sample, if the tests mentioned in 4.1.3 are not done immediately? (15 marks)

4.1.6 List **two (02)** types of counting chambers used in CSF cell counting. (10 marks)

4.1.7 Briefly explain the decontaminating and storing process of the counting chambers mentioned in 4.1.6 (15 marks)

4.2

4.2.1 Mention **two (02)** circumstances where drug level in the blood is measured. (05 marks)

4.2.2 Discuss the analytical issues in measuring drug levels in biological samples and the measures to overcome these issues. (20 marks)

5.

5.1 A 35 years old woman presented with fever, vomiting and abdominal pain. On examination she had yellow discolouration of skin and sclera. She was diagnosed with acute hepatitis.

5.1.1 List **five (05)** causes of acute hepatitis. (10 marks)

5.1.2 List **five (05)** basic blood/ urine investigations that can be done and mention the expected changes. (30 marks)

5.1.3 If an infective cause is suspected, list **two (02)** laboratory tests that can be done to see the causative agent. (10 marks)

5.2 Briefly, discuss patient preparation, precautions to be taken, collection tube to be used, sample type, transport and storage conditions of the following analytes:

5.2.1 Ionized calcium. (15 marks)

5.2.2 Iron. (15 marks)

5.2.3 HbA1C (Haemoglobin A1C). (10 marks)

5.2.4 Fasting Plasma glucose. (10 marks)

6. A 40 years old obese man with strong family history of heart disease was suspected to have hyperlipidemia. His family doctor advised him to do lipid profile as a screening test. The lipid profile results are as follows:

	Result	**Desieable range**
Total Cholesterol	6.48 mmol/L	<5.18 mmol/L
Triglycerides	4.97 mmol/L	<1.70 mmol/L
HDL cholesterol	1.34 mmol/L	≥1.54 mmol/L

LDL was not calculated.

6.1 Briefly explain the principle of **one (01)** enzymatic method that is routinely used in the clinical laboratories for the measurement of serum Total Cholesterol. (20 marks)

6.2 List **Two (02)** advantages of using enzymatic methods for Total Cholesterol measurement in routine clinical laboratories. (10 marks)

6.3 List **Two (02)** biochemical substances that can interfere with the enzymatic method mentioned in 6.1 (20 marks)

6.4 State the reason for not calculating the LDL Cholesterol value in this patient. (10 marks)

6.5 Mention **one (01)** direct method that is available to measure serum LDL Cholesterol. (10 marks)

Doctor advised him to follow the medications he prescribed and to do lipid profile again to monitor treatment after 3 months

The repeated test results are as follows:

	Results	**Desirable range**
Total Cholesterol	3.58 mmol/L	<5.18 mmol/L
Triglycerides	1.41 mmol/L	<1.70 mmol/L
HDL cholesterol	1.67 mmol/L	≥1.54 mmol/L

6.6 Calculate the LDL- Cholesterol value of the patient and mention the name of the equation you have used to calculate the LDL-Cholesterol value (30 Marks)

(Conversion factor from mmol/L to mg/dL of Total cholesterol, HDL and LDL = 38.6 and Triglycerides= 88.5)