UNIVERSITY OF JAFFNA, SRI LANKA

First Year Second Semester Examination in BScHons (Medical Laboratory Sciences) – 2019

MLSCB 1275 CLINICAL BIOCHEMISTRY I

PAPER II

Date: 28.01.2022 **Time: 2 hours**

Answer ALL EIGHT Questions.

Answer PART A And PART B in SEPARATE ANSWER BOOKS

PART A

1. **1.1** **1.1.1** List four indications of CSF analysis. **(20 Marks)**

   1.1.2 Define the term "Traumatic tap" during lumbar puncture. **(10 Marks)**

   1.1.3 Tabulate the observations / findings of a CSF sample to differentiate traumatic tap and haemorrhage. **(25 Marks)**

   1.2 **1.2.1** "Semen should be analysed after liquefaction". Briefly explain this statement. **(20 Marks)**

   1.2.2 Mention two stains that can be used to evaluate the morphology of spermatozoa. **(10 Marks)**

   1.2.3 List two tests that are used to detect sperm agglutination. **(10 Marks)**

   1.2.4 Mention the constituents of Seminal fluid diluting fluid. **(05 Marks)**

2. **2.1** List two methods available to measure plasma glucose level. **(10 Marks)**

2.2 Briefly explain the principle of one of the above mentioned methods. **(20 Marks)**

2.3 Indicate the components of anticoagulants that are commonly used for blood collection to measure plasma glucose level with their ratios. **(15 Marks)**

2.4 State the actions of the above mentioned components. **(10 Marks)**

2.5 Explain the clinical importance of Oral Glucose Tolerance Test (OGTT). **(20 Marks)**

2.6 Discuss the possible errors that may occur during the pre-analytical phase of OGTT which may lead to false results. **(25 Marks)**

3. The laboratory investigations of an adult patient with known chronic liver disease is given below

	Patient	**Reference Range**
Serum Total Calcium (mg/dL)	7.4	8.5 – 10.5
Serum Total Protein (g/dL)	5.0	6.0 – 8.0
Serum Albumin (g/dL)	2.5	3.5 – 5.0

3.1 Give the reference method used for the measurement of serum total calcium level. **(10 Marks)**

3.2 Calculate the corrected calcium of the above patient using the following equation and interpret your results. **(30 Marks)**

$$\text{Corrected Calcium } \left(\frac{\text{mg}}{\text{dL}}\right) = \text{Total Calcium } \left(\frac{\text{mg}}{\text{dL}}\right) + 0.8\,(4 - \text{Serum Albumin}) \left(\frac{\text{g}}{\text{dL}}\right)$$

3.3 Briefly explain the clinical significance of corrected calcium level. **(25 Marks)**

3.4 Give the precautionary measures that need to be taken during blood collection and the analysis of total calcium? **(25 Marks)**

3.5 Give the method/s that can be used to measure Ionized and free calcium. **(10 Marks)**

4. The Urine Full Report of a known diabetic patient on his routine check-up is given below

Colour:	Pale yellow	Pus cells:	3-5/ hpf
Clarity:	Turbid	Red cells:	10-15/ hpf
Specific gravity:	1.025	Epithelial cells:	Few
pH:	6.5	Casts:	Granular cast +
Albumin:	++	Organisms:	Nil
Glucose:	++		
Ketone bodies:	Trace		
Urobilinogen:	Normal		

4.1 Identify the abnormal findings on the above report. **(15 Marks)**

4.2 Give a manual method and the respective principle for each of the following components.

4.2.1 Albumin **(15 Marks)**

4.2.2 Glucose **(15 Marks)**

4.2.3 Ketone bodies **(15 Marks)**

4.3 Outline the mechanism of formation of urinary casts. **(20 Marks)**

4.4 Briefly explain the advantages and limitations of using reagent strips for urine analysis. **(20 Marks)**

5. **5.1** **5.1.1** Briefly explain the working principle of flame photometry. **(20 Marks)**

5.1.2 List four applications of flame photometry. **(20 Marks)**

5.2 **5.2.1** List the different fractions of α-globulins with four examples for each type. **(20 Marks)**

5.2.2 Briefly discuss the clinical importance of serum haptoglobin. **(30 Marks)**

5.2.3 List two diseases where polyclonal hypergammaglobulinemia is observed. **(10 Marks)**

PART B

6. **6.1** Give the basic principle of electrophoresis. **(30 Marks)**

   6.2 Give the applications of paper electrophoresis. **(20 Marks)**

   6.3 Give the labelled diagrams of serum electrophoretic patterns of

   6.3.1 nephrotic syndrome patient. **(25 Marks)**

   6.3.2 multiple myeloma patient. **(25 Marks)**

7. **7.1** Explain the basic principle of gel permeation chromatography. **(30 Marks)**

   7.2 Explain the advantages of the Gas Chromatography –Mass Spectrometry (GC-MS). **(30 Marks)**

   7.3 Explain the basic principle of hydrophobic interaction chromatography. **(40 Marks)**

8. **8.1** Explain how the polyacrylamide gel is casted for an electrophoretic separation. **(60 Marks)**

   8.2 Give the applications of agarose gel electrophoresis. **(40 Marks)**