

**UNIVERSITY OF JAFFNA, SRI LANKA**  
**BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES**  
**FOURTH YEAR FIRST SEMESTER EXAMINATION –OCTOBER 2019**

**MLSCB 4135 CLINICAL BIOCHEMISTRY II**

**Date: 07.11.2019**

**Time: 3 hours**

**ANSWER ALL SIX QUESTIONS.**

1. A 65 year old pure vegetarian lady who has Diabetes mellitus for 15 years was diagnosed to have chronic kidney disease.
- 1.1 An estimated glomerular filtration rate (eGFR) was calculated using the 4 variant MDRD formula and it was  $9.28 \text{ mL/min/1.73 m}^2$ . Comment on the above eGFR result. (10 Marks)
- 1.2 In a few days, 24-hour urine collection was requested for creatinine clearance. Give the advice you will give to the patient on 24-hour urine collection. (20 Marks)
- 1.3 This patient's laboratory investigations results are as follows:
- |                                 |                         |
|---------------------------------|-------------------------|
| Collected 24 hours urine volume | - 2100 mL               |
| Serum Creatinine                | - 440 $\mu\text{mol/L}$ |
| Urine creatinine                | - 9.24 mmol/L           |
| Body surface area               | - 1.79 $\text{m}^2$     |
- Calculate the normalized (Corrected) creatinine clearance of the above patient. (20 Marks)
- 1.4 Mention **one (01)** preservative that can be used for 24 hour urine collection for creatinine clearance (05 Marks)
- 1.5 Name **one (01)** conventional chemical method that is commonly used in most clinical laboratories in Sri Lanka. (05 Marks)
- 1.6 Write the principle of the method you mentioned in 1.5. (10 Marks)
- 1.7 List **five (05)** interfering substances of the method mentioned in 1.5 and briefly discuss **three (03)** methods available to minimize/remove the interferences. (30 Marks)

2.

2.1 A 36 year old man and his 32 year old wife were undergoing an evaluation for subfertility. A semen specimen was received to the laboratory for routine testing and the report is as follows:

### Semen Analysis

#### Physical Examination

Colour : Grey white

Volume : 2.5 mL

Liquefaction : 30 minutes

Viscosity : Smooth & watery

#### Microscopic examination

#### Lower reference limit

Motility : 70%

28%

Concentration :  $5 \times 10^6$ /mL

$15 \times 10^6$ /mL

Morphology : 67%

4 %

Vitality : 62%

59%

Leucocytes :  $1.5 \times 10^6$  cells/mL

$<1 \times 10^6$  cells/mL

2.1.1 List any abnormal and/ or discrepant results you find in the above report and explain the reasons behind each finding. (20 Marks)

2.1.2 Comment on the state of fertility of the above mentioned patient and mention the reason. (10 Marks)

2.1.3 Based on the given results, list **one (01)** chemical test that should be performed to evaluate the functional integrity of the seminal vesicles and ejaculatory ducts. (10 Marks)

2.2 A 4 year old boy was brought to the Paediatrician with fever and loose stools for the last 3 days. A stool full report was requested.

2.2.1 List the parameters included in the Stool full report (15 Marks)

2.2.2 At the same time serum C-reactive protein (CRP) test was requested. This test was done using a semi-quantitative slide method. Briefly explain the serological basis of falsely low results that could occur in this test. (20 Marks)

2.3 Write short notes on Haemagglutination inhibition test. (25 marks)

3.

3.1 20 year old lady presented to her General practitioner with cold intolerance, constipation and tiredness of 03 months duration.

Laboratory findings revealed the following:

Full blood count	-Normal	
Thyroid Stimulating hormone(TSH)	-9.2 mIU/L	(0.465- 4.680)

- 3.1.1 What test/tests will you do next to confirm the diagnosis and what result will you expect in this patient? (10 Marks)
- 3.1.2 What is the diagnosis? (10 Marks)
- 3.1.3 She was started on treatment and was asked to come after 2 weeks to see her thyroid status. Give the test/tests you will do and the precautions to be taken when doing the test. (30 Marks)
- 3.2 Discuss about antibody interference in immunoassays taking thyroid assays as example. Include methods to overcome such situations. (50 Marks)

4.

- 4.1. A 29 day old infant from neonatal intensive care unit had prolonged jaundice.
- 4.1.1 What is the type of jaundice that is present in this neonate? (10 Marks)
- 4.1.2 List **two (02)** causes for the above condition (10 Marks)
- 4.1.3 List **five (05)** investigations you will be doing in this neonate and give the expected results. (30 Marks)
- 4.2 A proficiency testing programme was planned in your Chemical pathology laboratory.
- 4.2.1 What are the steps involved in Proficiency testing (PT) and briefly explain each step. (30 Marks)
- 4.2.2 When an analyte is out of range in the PT report, what are the necessary practical steps to be taken. (20 Marks)

5. A 48 year old man presented with abdominal pain and haematuria of 2 days duration. Computed Tomographic (CT) scan showed a lesion completely obstructing the mid ureter and ureteric stone was suspected. His serum corrected calcium was 3.0 mmol/L (2.20-2.55).

- 5.1 Name **three (03)** possible causes for the above calcium value. (15 Marks)
- 5.2 Mention **two (02)** hormones involved in the maintenance of calcium homeostasis. (10 Marks)
- 5.3 Mention **three (03)** other biochemical tests to differentiate the conditions mentioned in 5.1 and indicate the expected changes. (15 Marks)

- 5.4 Mention the sample types, which you will receive to measure the tests you have mentioned in 5.3. (20 Marks)
- 5.5 Mention **one (01)** routine method used to measure total calcium/ ionized calcium in the laboratory and briefly explain the preparation, sample collection, sample type, interfering substances and the analytical method. (40 Marks)
6. A 55 year old man who is an alcoholic, presented to the surgical unit with abdominal pain and distension. He is a known type 2 diabetes mellitus patient. An Ultra sound scan of the abdomen revealed ascites.
- 6.1 Name **three (03)** possible causes of ascites in this patient (15 Marks)
- 6.2 List **three (03)** laboratory investigations that can be performed on the peritoneal fluid to arrive at a diagnosis. (15 Marks)
- 6.3 List **five (05)** parameters that will enable you to differentiate an exudate from transudate. (25 Marks)
- 6.4 Describe and illustrate with diagram the appearance of any **three (03)** types of cells you may see in any one of the condition you have mentioned in 6.1 (45 Marks)