UNIVERSITY OF JAFFNA, SRI LANKA

FACULTY OF ALLIED HEALTH SCIENCES

SECOND YEAR SECOND SEMESTER EXAMINATION IN BSc. HONS (MLS)- 2020

MLSCB 2235 CLINICAL BIOCHEMISTRY I

PAPER II

Date: 18.01.2023 **Time: 2 Hours**

ANSWER All THE SIX QUESTIONS IN SEPARATE ANSWER BOOKS

1.

1.1 Name **Three (03)** important buffer systems in the body for the maintenance of acid-base balance (20 Marks)

1.2 You are requested to prepare 0.2 mmol/L standard bicarbonate buffer using the particular volumes of 24 mmol/L of sodium bicarbonate ($NaHCO_3$) and 1.2 mmol/L of carbonic acid (H_2CO_3). Calculate the pH value of the buffer solution using the Henderson-Hasselbalch equation. The pKa for this buffer system is 6.1. (log of 20=1.3, log of 240= 2.3) (20 Marks)

1.3 Describe the factors that should be considered during the selection and preparation of a buffer solution. (20 Marks)

1.4 List **Five (05)** uses of buffers in routine laboratories (20 Marks)

1.5 List **Two (02)** causes each for acidosis and alkalosis (20 marks)

2. A 50-year Sri Lankan man was suspected to have chronic kidney disease as a complication due to prolonged uncontrolled diabetes mellitus. His estimated glomerular filtration value (eGFR) using the MDRD equation is 33.5 mL/min/1.73 m^2

2.1 How will you stage Chronic kidney disease (CKD) based on the eGFR (10 Marks)

2.2 List **Four (04)** instances where the eGFR is not applicable (20 Marks)

2.3 Name the serum parameter used to calculate eGFR and mention **One (01)** of the conventional chemical method used to measure in most clinical laboratories in Sri Lanka (10 Marks)

2.4 Briefly explain the principle behind the test method mentioned in **2.3** (20 Marks)

2.5 List **Two (02)** each positive and negative interferences that affect the test method mentioned in **2.3** (20 Marks)

2.6 Mention **Five (05)** modifications that are incorporated in laboratory procedures/ methods to overcome the interference mentioned in **2.5** (20 Marks)

3.

3.1

3.1.1 List **Four (04)** types of urine specimens which is used in chemical pathology laboratories for different analyses (10 Marks)

3.1.2 Mention **Five (05)** instances where urine samples are rejected at the chemical pathology laboratory (20 Marks)

3.1.3 List **Two (02)** causes for pathological and non-pathological urine turbidity (20 Marks)

3.2

3.2.1 Briefly explain how you will handle urine strips while doing urinalysis and mention the care in handling and storing strips. (40 Marks)

3.2.2 Mention **Two (02)** interfering factors in estimating glucose using urine reagent strips (10 Marks)

4. A 45 year old woman, with low Haemoglobin of 8.0 mg/dL, is being investigated for anaemia in the Haematology Clinic. She was suspected to have iron deficiency anaemia

4.1 List **three (03)** causes for iron deficiency (15 marks)

4.2 How is iron distributed in the body? (10 marks)

4.3 What further haematological indices should be done and give the probable changes you will see in iron deficiency anaemia. (10 marks)

4.4 How will you describe the red blood cells in an iron deficient blood film? (10 marks)

4.5

4.5.1 List **five (05)** other blood tests you can do in this patient at Chemical Pathology Laboratory to confirm iron deficiency (10 marks)

4.5.2 Explain the patient preparation if any, for the tests mentioned in **4.5.1** (20 marks)

4.5.3 Mention the probable changes expected for each of the tests mentioned in **4.5.1** (10 marks)

4.5.4 Give the principle behind **one (01)** test mentioned in **4.5.1** (15 marks)

5.

5.1 A 47 year old woman presented to the Accident & Emergency department with severe abdominal pain, fullness in the abdomen and vomiting. She was suspected to have acute pancreatitis.

5.1.1 List **four (04)** causes for acute pancreatitis (10 marks)

5.1.2 Mention **one (01)** routine Clinical Biochemistry test that is done in local hospitals, and mention the expected change. (10 marks)

5.1.3 List **five (05)** causes for the reduced specificity of the test mentioned in **5.1.2** (10 marks)

5.1.4 List **another one (01)** important test, when combined with the test mentioned in **5.1.2** that will give increased specificity and sensitivity (10 marks)

5.1.5 List **three (03)** other Clinical Biochemistry tests you will do to monitor and see the prognosis of the disease (15 marks)

5.1.6 This patient recovered and went home, but she was admitted with similar episodes for few times and 5 years later she was found to have chronic pancreatitis.

5.1.6.1 List **two (02)** noninvasive tests to diagnose chronic pancreatitis. (10 marks)

5.1.6.2 Give **one (01)** complication of chronic pancreatitis. (05 marks)

5.2

5.2.1 List **Four (04)** types of samples that can be analyzed for various analytes during investigation of Porphyria. (10 marks)

5.2.2 List the precautions that should be taken in sample collection and storage for various samples in a patient with suspected porphyria (10 marks)

5.2.3 List **Two (02)** screening tests that are done for Porphobilinogen (10 marks)

6.

6.1 A 55 year old man presented to the outpatient department with a complain of increased urination, weight gain and itching of skin for 3 months duration. He was suspected to have Diabetes mellitus (DM).

6.1.1 List **three (03)** laboratory tests that can be done to diagnose Diabetes. (15 marks)

6.1.2 What are the cutoff values for the tests mentioned in **6.1.1** for Normal, Prediabetes and Diabetes mellitus (15 marks)

6.1.3 List **one (01)** blood investigation that can be done for long term monitoring of Diabetes (05 marks)

6.1.4 List **five (05)** blood investigations and expected abnormalities that are related to complications in this patient (20 marks)

6.1.5 Briefly explain the principle of **one (01)** method for plasma glucose measurement (20 marks)

6.2 How will you screen for Gestational Diabetes Mellitus and briefly explain the screening procedure (25 marks)