UNIVERSITY OF JAFFNA, SRI LANKA

BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES

FIRST YEAR SECOND SEMESTER EXAMINATION- FEBRUARY 2017

MLSCB 1275 CLINICAL BIOCHEMISTRY I

PAPER II

DATE: 22.02.2017 **TIME: 02 Hours**

ANSWER ALL EIGHT QUESTIONS

ANSWER EACH PART IN SEPARATE ANSWER BOOKS.

PART A

1. 1.1 You are provided with 0.1M solution of sodium bicarbonate ($NaHCO_3$) and sodium carbonate•decahydrate (Na_2CO_3•$10H_2O$). You are requested to prepare 100mL of 0.1 M Bicarbonate buffer solution at pH 10.0. The pKa value of this buffer system is 9.8. The log value of 0.2 is 1.585.

1.1.1 Calculate the ratio of conjugate base to acid of the above solution using the Henderson-Hasselbalch equation. **(35 Marks)**

1.1.2 How would you prepare the above buffer solution at pH 10. **(25 Marks)**

1.2 What are the limitations of the phosphate buffer while using it in the experiments and how would you minimize the limitation. **(40 Marks)**

2. 2.1 Explain two methods involved in the loading of analytes on electrophoretic paper. **(30 Marks)**

2.2 Give the usage of denaturing polyacrylamide gel electrophoresis. **(25 Marks)**

2.3 How would you perform the paper electrophoresis to identify the pattern of serum proteins. **(45 Marks)**

3. 3.1 A 25 year old man was presented with high fever and vomiting for 5days. He felt a burning sensation when urinating. His urine and blood samples were sent to the laboratory for the investigations. Reports of urinalysis and serum electrolytes are given below.

Urinalysis report	**Serum electrolyte**
Colour-yellow	Na^+ -136 mmol/L
Specific gravity-1.017	K^+ - 3.0mmol/L
pH-6.5	Cl^- - 90mmol/L
Protein –trace	HCO_3^- -35mmol/L
Leukocyte esterase-(+)	
WBC- 30-40/hpf	
Cast- WBC cast (+)	
Glucose (–)	
Ketone (-)	
Bilirubin (–)	
Urobilinogen (–)	
Blood (–)	

3.1.1 What could be the probable diagnosis, give explanation? **(20 Marks)**

3.1.2 Comment the report of serum electrolyte. **(25 Marks)**

3.1.3 Give the principle of the estimation of sodium and potassium by Flame photometry. **(25 Marks)**

3.2 Give the importance of the analysis of Arterial blood gas? **(30 Marks)**

4. 4.1 Explain the steps involved in determination of amino acids by using thin layer chromatography. **(50 (Marks)**

4.2 Explain the working principle of reversed-phase high performance liquid chromatography. **(30 Marks)**

4.3 List three buffers for each anion and cation exchange chromatography. **(20 Marks)**

5. 5.1 Give the principle of the method of determination of blood glucose by enzymatic method. **(35 Marks)**

5.2 Give the principle of the estimation of plasma calcium. **(25 Marks)**

5.3 A 5mL of blood sample was sent to your laboratory with a brief history of yellow discoloration of skin, pale colour stool and dark colour urine. You are requested to perform the relevant test.

5.3.1 What biochemical parameter you would test to confirm the above mentioned condition. **(05 Marks)**

5.3.2 Briefly explain how you would estimate the above mentioned parameter. **(20Marks)**

5.3.3 Give the biochemical basis for the elevation of above mentioned parameter. **(15 Marks)**

6. Write short notes on

6.1 Plasma free metanephrines **(25 Marks)**

6.2 Estimation of serum urea **(25 Marks)**

6.3 Assessing the detoxification function of liver **(25 Marks)**

6.4 Microscopic examination of urine **(25 Marks)**

PART B

7.

7.1 List two indications for seminal fluid analysis. **(20 Marks)**

7.2 List one important preparation advice you would give for the gentleman who comes to get a date for seminal fluid analysis. **(20 Marks)**

7.3 List four precautions which should be taken during collection of sample. **(20 Marks)**

7.4 What is the complete volume of ejaculate expected in a normal person? **(10 Marks)**

7.5 Name five organ sources that contribute to seminal fluid formation. **(10 Marks)**

7.6 List four important parameters that are reported on seminal fluid analysis. **(20 Marks)**

8. Write notes on

8.1 Identity assurance for medical laboratory samples. **(25 Marks)**

8.2 Quality control materials. **(25 Marks)**

8.3 Westgard multi rules. **(25 Marks)**

8.4 Precautions to be taken in cerebrospinal fluid collection and analysis. **(25 Marks)**