

**UNIVERSITY OF JAFFNA, SRI LANKA**  
**BACHELOR OF SCIENCE IN MEDICAL LABORATORY SCIENCES**  
**FIRST YEAR SECOND SEMESTER EXAMINATION- JULY 2015**  
**MLSCB1275 CLINICAL BIOCHEMISTRY I**

**PAPER II**

**DATE: 15.07.2015**

**TIME: 02 Hours**

**ANSWER ALL EIGHT QUESTIONS**

**ANSWER EACH PART IN SEPARATE ANSWER BOOKS.**

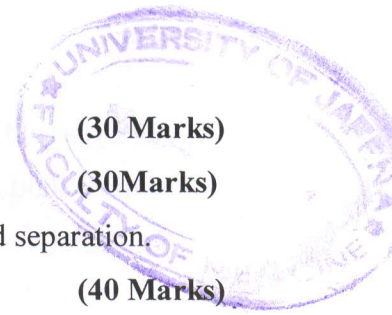
**PART A**

1. 1.1 Briefly explain the role of buffers in acid base balance of the body. **(25 Marks)**  
  
1.2 You are provided with 0.2 M solutions of sodium dihydrogen phosphate and disodium hydrogen phosphate. You are requested to prepare 20mL of 0.1 M phosphate buffer solution at pH 7.0. The pKa for this buffer system is 6.8. The log value of 0.2 is 1.585.
  - 1.2.1 Calculate the ratio of conjugate base to acid of the above solution using the Henderson-Hasselbalch equation. **(35 Marks)**
  - 1.2.2 Write the procedures for preparing the above phosphate buffer solution at pH 7. **(20 Marks)**
  - 1.2.3 What are the limitations of the phosphate buffer while using it in the experiments and how would you minimize the limitation. **(20 Marks)**
  
2. 2.1 Give the steps involved in the separation of serum protein by electrophoresis. **(50 Marks)**  
  
2.2. Graphically show how the 'serum electrophoresis densitometer pattern' of a patient with nephrotic syndrome will differ from that of a normal individual. Explain the differences in the pattern. **(50 Marks)**

3. A 8 year old boy presented with fever and vomiting for 5 days. On clinical examination he had renal angle tenderness. Because of excessive vomiting he refused to eat and he became lethargic. His urine and blood samples were sent to the laboratory for the investigations. Reports of urinalysis, serum electrolytes and arterial blood gas (ABG) analysis are given below.

Urinalysis report	Serum Electrolyte	ABG
Colour-yellow	Na <sup>+</sup> -138mmol/L	PaO <sub>2</sub> -75mmHg
Specific gravity-1.017	K <sup>+</sup> - 3.0mmol/L	PaCO <sub>2</sub> -50mmHg
PH-6.5	Cl <sup>-</sup> - 90mmol/L	HCO <sub>3</sub> <sup>-</sup> -35mmol/L
Protein -trace		pH- 7.56
Leukocyte esterase-(+)		
WBC- 20-30/hpf		
Cast- WBC cast(+)		
Glucose(-)		
Ketone(+)		
Bilirubin(-)		
Urobilinogen(-)		
Blood(-)		

- 3.1. 3.1.1 What could be the probable diagnosis? **(10 Marks)**
- 3.1.2 How would you instruct the mother to collect his urine sample for urine culture? **(25 Marks)**
- 3.1.3 What is the cause for the ketone bodies in urine? **(15 Marks)**
- 3.1.4 How would you perform the ketone bodies in urine? **(20 Marks)**
- 3.2. 3.2.1 Interpret the electrolyte report of this patient? **(15 Marks)**
- 3.3 3.3.1. Interpret the ABG report of this patient? **(15 Marks)**



- 4. 4.1 Give the principle of ion exchange chromatography. (30 Marks)
- 4.2 Discuss the detector of a gas chromatography. (30 Marks)
- 4.3 How would you prepare the column chromatography for amino acid separation. (40 Marks)
  
- 5. Write short notes on
  - 5.1. Oral glucose tolerance test (25 Marks)
  - 5.2. Vanillylmandelic acid (VMA) (25 Marks)
  - 5.3. Azotemia (25 Marks)
  - 5.4. Determination of liver enzymes. (25 Marks)

**PART B**

- 6. A 35 year old presented with yellowish discoloration of the skin and eyes to the emergency unit.

Her blood was sent for investigations and the results are as follows

Serum

Alanine aminotransferase	620 mIU/L	(3-40)
Aspartate aminotransferase	360 mIU/L	(13-31)
Alkaline phosphatase	390 IU/L	(100-380)
Total Bilirubin	4.7 mg/dl	(<1.0)
Direct Bilirubin	1.4 mg/dl	(<0.7)
Total Protein	7.0 g/dl	(6.1-7.7)
Albumin	4.0 g/dl	(3.6-4.8)
Globulin	3.0 g/dl	(2.2-4.0)

- 6.1. What can be the most probable type of jaundice in this patient? (20 Marks)
- 6.2. List three causes for the above type of jaundice (30 Marks)
- 6.3. List one investigation each to find the cause for each causes you have mentioned in 6.2 (30 Marks)
- 6.4. What is the tumour marker that you will do in a patient if you suspect liver malignancy? (20 Marks)

7. A 28 year old lady is being investigated for subfertility. Her husband was asked to do the seminal fluid analysis in your laboratory.

7.1. What is seminal fluid analysis? (10 Marks)

7.2. List two indications for seminal fluid analysis? (20 Marks)

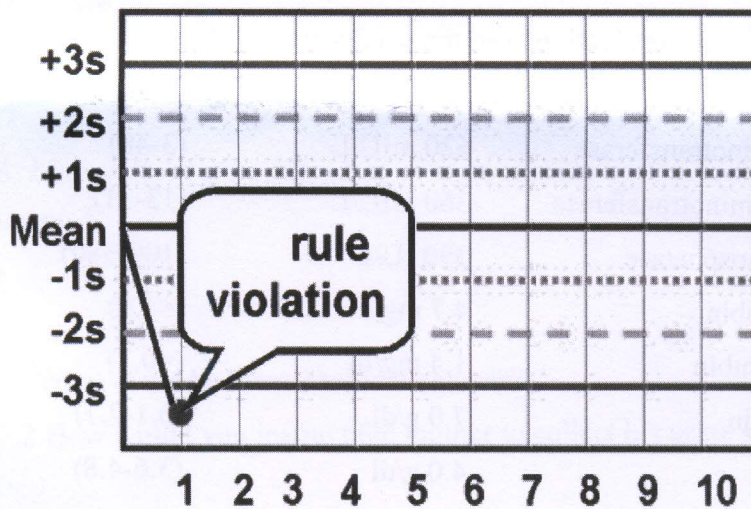
7.3. What advice will you give when he comes for a date for seminal fluid analysis? (50 Marks)

7.4. What is oligospermia? (20 Marks)

8. Your laboratory is following internal quality control measures and you are asked to see whether the Westgard rules have been violated.

8.1. Give the Westgard rules that are violated in the following Levy Jennings Chart and the type of error in each violation.

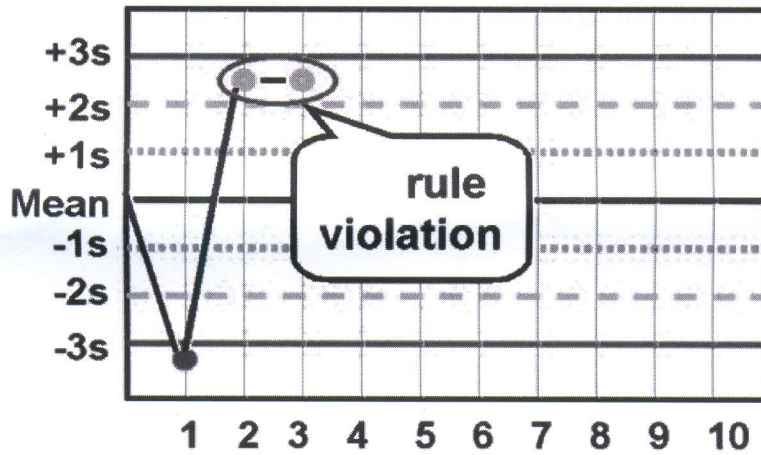
8.1.1.



(20 Marks)

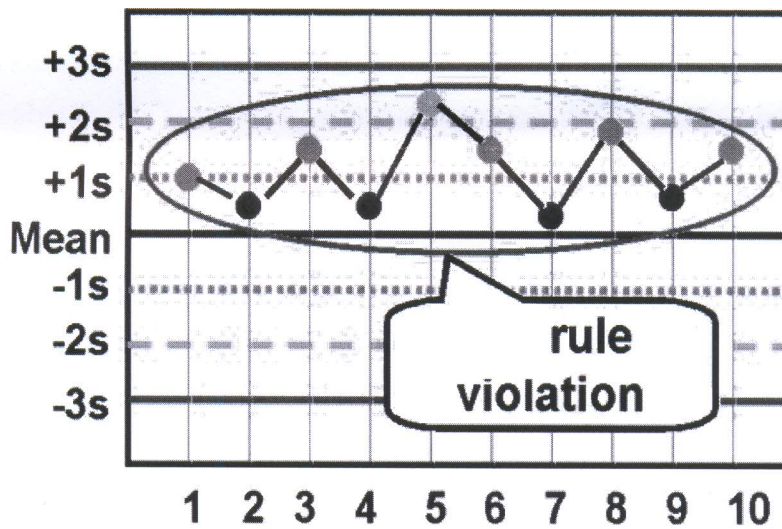


8.1.2.



(20 Marks)

8.1.3.



(20 Marks)

8.2. List two advantages of multirule quality control procedures.

(20 Marks)

8.3. List two good qualities the quality control should possess.

(20 Marks)