

## **WARNING**

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Family Name					
Given Name/s					
Student Number					
Teaching Period	Semester 1, 2018				

<b>MLS100 – Medical Laboratory Science</b>	<b>DURATION</b>	
	Reading Time:	<b>10 minutes</b>
	Writing Time:	<b>120 minutes</b>
<b>INSTRUCTIONS TO CANDIDATES</b>		
<p>The examination has 2 sections.</p> <p>Section A:                   45 marks - Marks for each question are of equal value Suggested Time:         60 mins Multiple Choice Questions:     Answer ALL (45) questions.</p> <p>Section B:                   58 marks - Marks for each question are NOT of equal value Suggested Time:         60 mins Short Essay Questions:    Answer ALL (8) questions</p> <p>Total marks for this examination: 103</p>		
<b>EXAM CONDITIONS</b>		
<b><u>You may begin writing from the commencement of the examination session.</u></b> The reading time indicated above is provided as a guide only.		
This is a CLOSED BOOK examination		
Any non-programmable calculator is permitted		
No handwritten notes are permitted		
No dictionaries are permitted		
<b>ADDITIONAL AUTHORISED MATERIALS</b>	<b>EXAMINATION MATERIALS TO BE SUPPLIED</b>	
None	1 x 16 Page Book 1 x 5-Multiple Choice Answer Sheet 1 x Scrap Paper	

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DOUBLE-SIDED.**

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## Section A

## Section B

### Short Answer Questions

Total No of Marks for this Section: 58

This section should be answered in the Answer Booklet provided.

Marks for each question are indicated. Suggested time allocation for Section B: 60 mins

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#### Question 1

Match the following words with their appropriate meanings.

- |                            |  |
|----------------------------|--|
| a. Oliguria                | 1. Urine collected immediately upon waking up in the morning   |
| b. Anuria                  | 2. Production of more than 2000mL of urine in 24 hours   |
| c. Polyuria                | 3. Urine sample collected at a specific time   |
| d. First morning catch     | 4. Excretion of less than 400mL of urine within 24 hours in an adult   |
| e. Culture and sensitivity | 5. Complete absence of urine   |
| f. Random urine specimen   | 6. Urine sample collected at any time with no patient preparation  |
| g. 24-hour sample          | 7. Collective sample that includes all urine output over a 24-hour period  |
| h. Timed specimen          | 8. Test performed to determine the bacteria responsible for causing an infection and which antibiotics will be effective in treating the infection |

(Marks: 8)

#### Question 2

You are required to prepare 200mL of a physiological saline solution, which is 0.9% NaCl.

- (a) How much solute is required? How would you measure this? (Marks: 2)
- (b) How much solvent is required? How would you measure this? (Marks: 1)
- (c) Discuss three (3) technical errors that must be avoided to ensure that your solution has been made correctly. (Marks: 3)

### Question 3

What is the ultimate goal of a diagnostic laboratory? Explain how this is improved through automation (provide at least three (3) examples).

(Marks: 4)

### Question 4

A diagnostic laboratory runs a cholesterol assay. To monitor the test, they run a control daily. The control value is 250mg/L. The data for the last 30 days is in the table below.

(a) What is the general purpose of plotting a Levey-Jennings chart?

(Marks: 1)

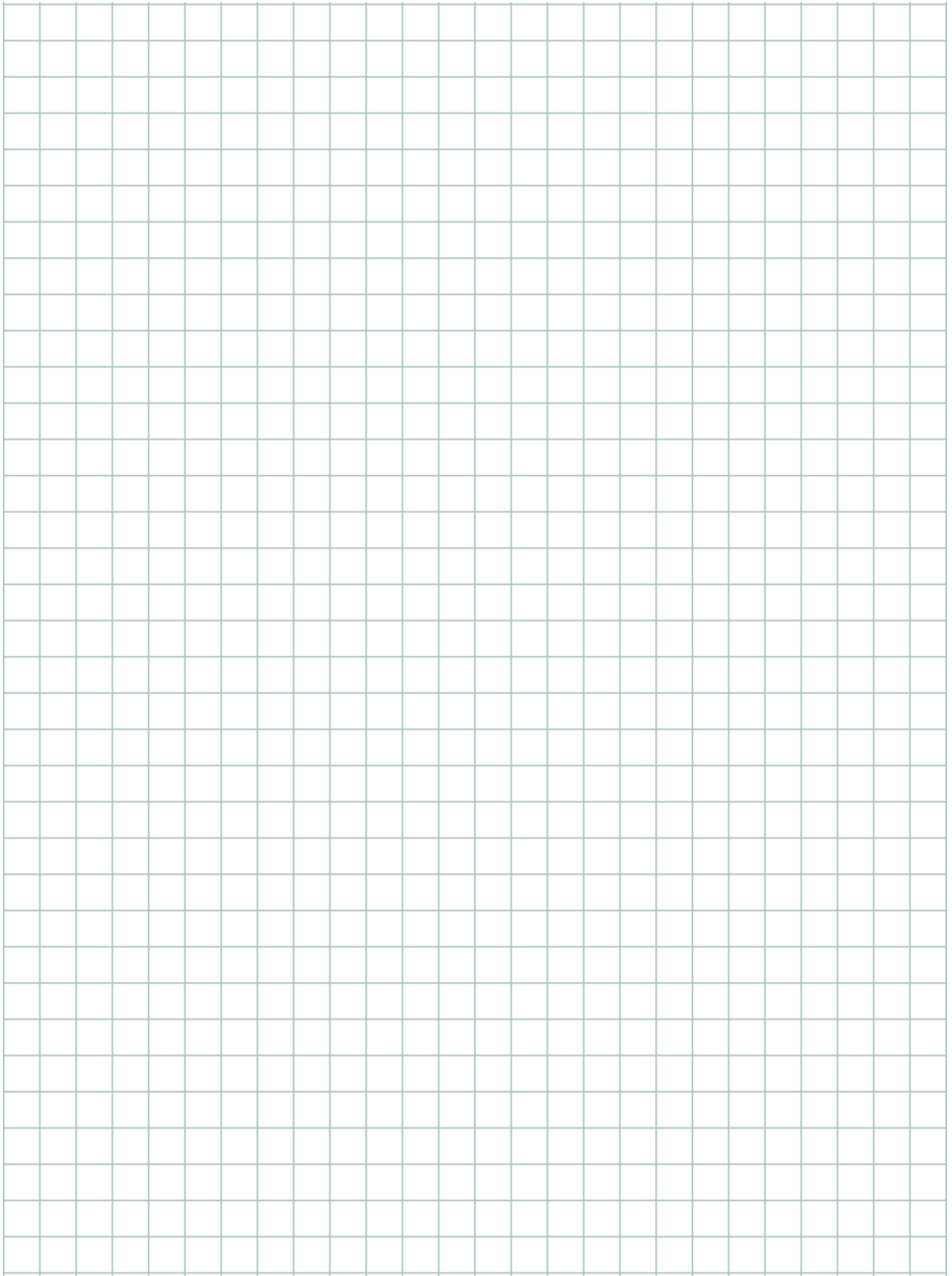
(b) What are the control limits of Levey-Jennings charts?

(Marks: 2)

(c) Use the data within the table and plot the assay results as a Levey-Jennings chart. Looking at the chart are there any days that the control value would raise concerns regarding the test? If so, which days and why?

(Marks: 6)

DAY	CONTROL	DAY	CONTROL	DAY	CONTROL
1	250	11	240	21	247
2	255	12	254	22	245
3	245	13	246	23	248
4	232	14	257	24	249
5	232	15	250	25	241
6	257	16	255	26	247
7	244	17	259	27	240
8	259	18	247	28	252
9	262	19	246	29	247
10	246	20	248	30	264



### Question 5

Explain the difference between centrifugation, spectrophotometry, electrophoresis and microscopy.

(Marks: 8)

### Question 6

An 8-year old girl has been complaining that it feels like she needs to urinate all the time. She says that it burns when she does void, and it is cloudy. She went to her pediatrician, where her urine was collected for a routine urinalysis and culture. The following results were obtained:

#### Physical appearance

Colour: Pale  
Transparency: Cloudy

#### Microscopic Appearance

RBCs: 0-2/hpf  
WBCs: 50-100hpf; clumps seen  
Casts: None  
Crystals: Moderate amounts  
Bacteria: Many rods

#### Chemical Composition

pH: 7.5  
Specific gravity: 1.010  
Protein: Trace  
Blood: Negative  
Nitrate: Positive  
Leukocyte esterase: Positive  
Glucose: Negative  
Ketones: Negative  
Bilirubin: Negative  
Urobilinogen: Normal

(a) Based on the following results, what would your likely diagnosis be for this patient?

(Marks: 2)

(b) Explain what results have led you to this diagnosis?

HINT: You should be able to identify five.

(Marks: 5)

### Question 7

(a) Name the primary stain used in a microbiology laboratory.

(Marks: 1)

(b) Explain how this is used to differentiate bacteria.

(Marks: 4)

(c) What is the critical step in this stain? Explain why it is such a critical step

(Marks: 2)

## Question 8

(a) One of the key skills in haematology is preparing a blood smear. There are several important factors that are required to achieve a suitable smear. List three (3) of these factors, detailing them on a diagram.

(Marks: 4)

(b) What would be the outcome of the following attempts in making a blood smear?

- a. A large angle between the slide and spreader or a slow stroke across the slide with the spreader.
- b. A small angle between the slide and the spreader or a fast stroke across the slide with the spreader.
- c. A chipped spreader.
- d. An evacuated tube that has not been inverted correctly.

(Marks: 2)

(c) Blood smears are often used for examining cell morphology. What are the three (3) morphological classifications of anaemia and provide an example of each type.

(Marks: 3)