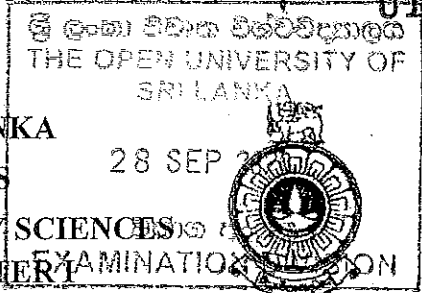


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THE OPEN UNIVERSITY OF SRI LANKA  
FACULTY OF HEALTH SCIENCES  
DEPARTMENT OF MEDICAL LABORATORY SCIENCES  
ACADEMIC YEAR 2019/2020 - SEMESTER I

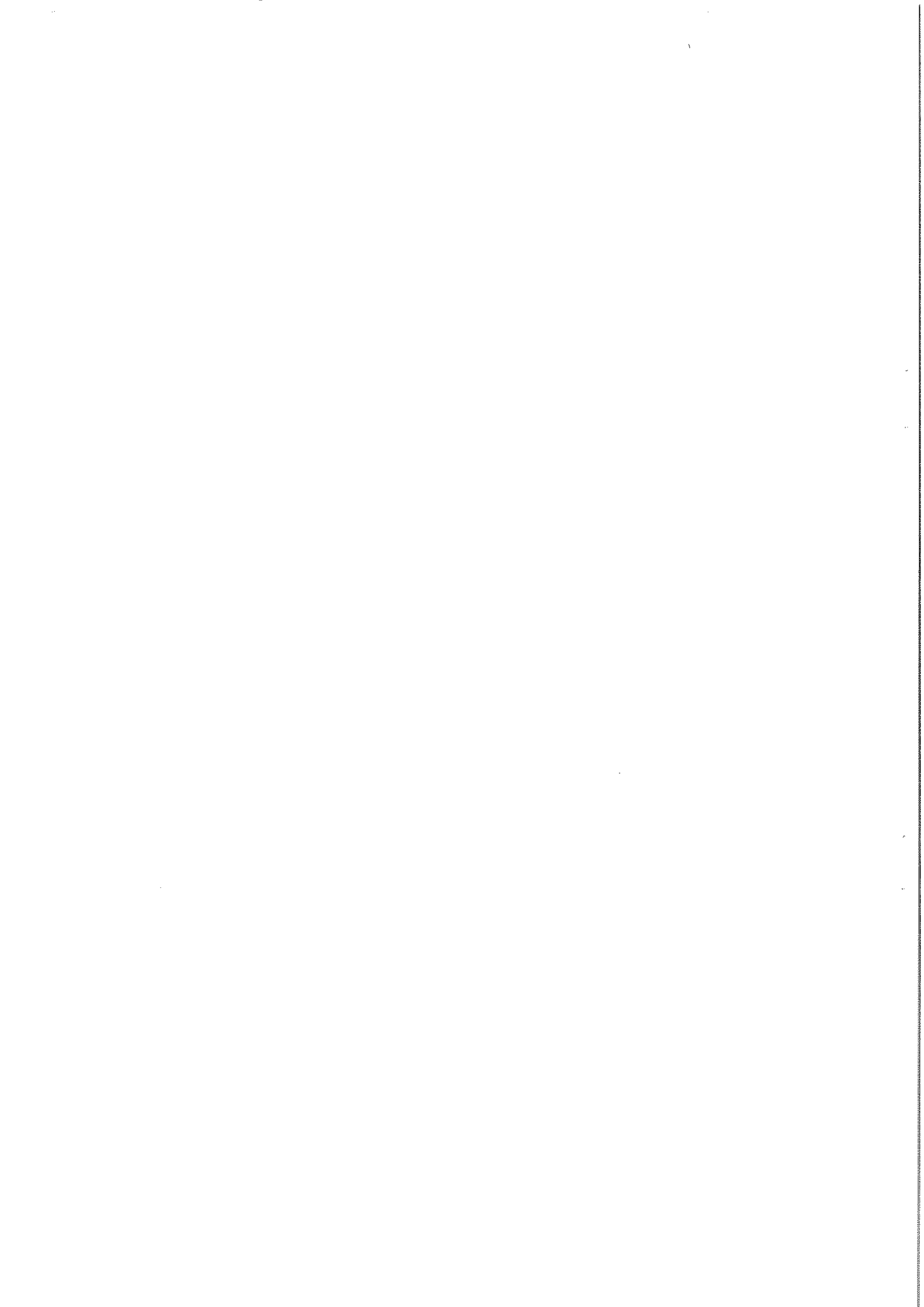
BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS  
MDU5407 - LABORATORY AUTOMATION & INSTRUMENTATION

FINAL EXAMINATION

DURATION: THREE HOURS

DATE: 28<sup>th</sup> SEPTEMBER 2020

TIME: 9.30 AM - 12.30 PM



**Part B: Structured Essay Questions (40 marks)**

**Q1**

Define the terms given below which are used in chromatographic methods.

1.1 Mobile phase (02 marks)

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.....  
.....  
.....  
.....  
.....

1.2 Stationary phase (02 marks)

.....  
.....  
.....  
.....  
.....  
.....

1.3 Retention time (02 marks)

.....  
.....  
.....  
.....

1.4 Retention factor (02 marks)

.....  
.....  
.....  
.....

1.5 Selectivity factor

(02 marks)

.....  
.....  
.....  
.....

**(Total 10 marks)**

**Q2**

2.1 What is electro-osmotic flow?

(02 marks)

.....  
.....  
.....  
.....  
.....

2.2 Why is the electro-osmotic flow should be suppressed in electrophoresis? (04 marks)

.....  
.....  
.....  
.....

2.3 What is the use of buffers in gel electrophoresis?

(04 marks)

.....  
.....  
.....  
.....

**(Total 10 marks)**

**Q3**

Explain how the following parameters can be used to improve the performance of a spectrophotometer.

3.1 Slit width (03 marks)

.....  
.....  
.....  
.....  
.....

3.2 The monochromator (04 marks)

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.....  
.....  
.....  
.....  
.....

3.3 Amount of stray light (03 marks)

.....  
.....  
.....  
.....  
.....  
.....

**(Total 10 marks)**



Index No.....

4.3 List the **TWO (02)** differences between 3-part and 5- part differential analyzers.

(02 marks)

.....

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.....

**(Total 10 marks)**

**Part C: Essay type questions (30 marks)**

**Q1**

- i. What is the principle behind the 2 major types of automated analyzers? (05 marks)
- ii. Briefly discuss the major steps in automated analysis. (10 marks)

**Q2**

To determine the concentrations (mol/L) of P and Q separately and in an unknown sample, the following representative absorbance data were obtained. (15 marks)

Sample	Compound P (mol/L)	Compound Q (mol/L)	Absorbance at 510 nm	Absorbance at 620 nm
Only P	0.15	0	0.714	0.097
Only Q	0	0.06	0.298	0.757
The mixture	Unknown	Unknown	0.671	0.330

- i. Calculate the four molar absorptivities of both P and Q at 510 nm and 620 nm.
- ii. Calculate the concentration of P and Q in the unknown mixture.