Student Code						

Determination of Refractive Index Gradient and Diffusion Coefficient of Salt Solution from Laser Deflection Measurement (10 pt.)

A. Measurement of Refractive Index Gradient of Salt-Water Solution (4.5 pt.)

Question	Answer	Marks
A.1 (**1.2 pt.**)	Enclose the millimeter block paper that has been used for making the deflectogram. Please make sure that you have written your student code numbers and the concentration of the solutions that you used on this millimeter block paper.	Deflectogram of C_0 = 23 g/150 mL
A.1	Enclose the millimeter block paper that has been used for making the deflectogram. Please make sure that you have written your student code numbers and the concentration of the solutions that you used on this millimeter block paper.	Deflectogram of C_0 = 28 gr/150 mL
A.1	Enclose the millimeter block paper that has been used for making the	Deflectogram

deflectogram. Please make sure that you have written your student code numbers and the concentration of the solutions that you used on this millimeter block paper.

of

C_0 = 33 g/150 mL

A2.

(1.5 pt.)

i	δ_i (cm)	ξ_i (cm)	Z_0 (cm)	d (cm)	Z (cm)
1					
2			[redacted]	[redacted]	[redacted]
3			[redacted]	[redacted]	[redacted]
4			[redacted]	[redacted]	[redacted]
5			[redacted]	[redacted]	[redacted]
6			[redacted]	[redacted]	[redacted]
7			[redacted]	[redacted]	[redacted]
8			[redacted]	[redacted]	[redacted]
9			[redacted]	[redacted]	[redacted]
10			[redacted]	[redacted]	[redacted]
11			[redacted]	[redacted]	[redacted]
12			[redacted]	[redacted]	[redacted]
13			[redacted]	[redacted]	[redacted]
14			[redacted]	[redacted]	[redacted]
15			[redacted]	[redacted]	[redacted]
16			[redacted]	[redacted]	[redacted]
17			[redacted]	[redacted]	[redacted]
18			[redacted]	[redacted]	[redacted]
19			[redacted]	[redacted]	[redacted]
20			[redacted]	[redacted]	[redacted]

Table 1 of

C_0 = 23 g/150 mL

A.2

i	δ_i (cm)	ξ_i (cm)	Z_0 (cm)	d (cm)	Z (cm)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Table 1 of

C_0 = 28 g/150 mL

A.2

i	δ_i (cm)	ξ_i (cm)	Z_0 (cm)	d (cm)	Z (cm)
1					
2					
3					
4					
5					
6					
7					
8					

Table 1 of

C_0 = 33 g/150 mL

9			[redacted]	[redacted]	[redacted]	
10			[redacted]	[redacted]	[redacted]	
11			[redacted]	[redacted]	[redacted]	
12			[redacted]	[redacted]	[redacted]	
13			[redacted]	[redacted]	[redacted]	
14			[redacted]	[redacted]	[redacted]	
15			[redacted]	[redacted]	[redacted]	
16			[redacted]	[redacted]	[redacted]	
17			[redacted]	[redacted]	[redacted]	
18			[redacted]	[redacted]	[redacted]	
19			[redacted]	[redacted]	[redacted]	
20			[redacted]	[redacted]	[redacted]	

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A.3

(1.5 pt.)

i	Y_i (cm)	dn/dY
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Table 2 of

C_0 = 23 g/150 mL

A.3

Plot

$\frac{dn}{dY}$ vs Y

C_0 = 23 g/150 mL

A.3

i	Y_i (cm)	dn/dY
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Table 2 of

C_0 = 28 g/150 mL

11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

A.3

Plot

$\frac{dn}{dY}$ vs Y

C_0 = 28 g/150 mL

A.3

i	Y_i (cm)	dn/dY
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Table 2 of

C_0 = 33 g/150 mL

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A.3		Plot $\frac{dn}{dY}$ vs Y C_0 = 33 g/150 mL
A.4 **(0.3 pt.)**	h for 23 g/150 mL = cm h for 28 g/150 mL = cm h for 33 g/150 mL = cm	

B: Determination of Diffusion Coefficient (4.2 points)

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>B.1

(0.9 pt.)</td><td>Linear form of eq.(3)</td><td></td></tr>
<tr><td>B.2

(1.8 pt.)</td><td>
<table>
<tr><td>i</td><td></td><td></td></tr>
<tr><td>1</td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td></tr>
<tr><td>5</td><td></td><td></td></tr>
<tr><td>6</td><td></td><td></td></tr>
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</table>
</td><td>Table 3 of C_0 = 23 g/150 mL</td></tr>
<tr><td>B.2</td><td></td><td>Plot of

Table 3

C_0 = 23 g/150 mL</td></tr>
</table>

m (slope of the graph) =

B.2

i		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

Table 3 of C_0 = 28 g/150 mL

15		
16		
17		
18		
19		
20		

B.2

m (slope of the graph) =

Plot of

Table 3

C_0 = 28 g/150 mL

B.2

i		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Table 3 of C_0 = 33 g/150 mL

B.2

Plot of

Table 3

C_0 = 33 g/150 mL

m (slope of the graph) =

B.3

(1.5 pt.)

D of 23 g/150 mL = cm^2/s

D of 28 g/150 mL = cm^2/s

D of 33 g/150 mL = cm^2/s

C. Nonlinear diffusion (1.3 points)

Question	Answer	Marks
C.1 **(1.3 pt.)**		Plot D vs. C_0
C.1	The rate change of diffusion coefficient w.r.t the change of salt solution concentrations:	