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用激光偏转法来测定折射率梯度和盐溶液的扩散系数 (10 pt.)

A. 测量盐水溶液的折射率梯度(4.5 pt.)

Question	Answer	Marks
A.1 (1.2 pt.)	将画有激光偏转图像的毫米坐标纸装入上交的信封.并确保你已经写上了学生号码和实验时对应的盐水浓度。	$C_0 = 23$ g/150 mL对应的 偏转 图
A.1	将画有激光偏转图像的毫米坐标纸装入上交的信封.并确保你已经写上了学生号码和实验时对应的盐水浓度。	Deflectogram of $C_0 = 28$ gr/150 mL
A.1	将画有激光偏转图像的毫米坐标纸装入上交的信封.并确保你已经写上了学生号码和实验时对应的盐水浓度。	Deflectogram of

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$C_0 = 33 \text{ g/150 mL}$

A2.
(1.5 pt.)

i	δ_i (cm)	ξ_i (cm)	Z_0 (cm)	d (cm)	Z (cm)
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Table 1 of

$C_0 = 23 \text{ g/150 mL}$

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AE1

A.2	<table border="1"> <thead> <tr> <th>i</th> <th>δ_i (cm)</th> <th>ξ_i (cm)</th> <th>Z_0 (cm)</th> <th>d (cm)</th> <th>Z (cm)</th> </tr> </thead> <tbody> <tr><td>1</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>12</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>13</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>15</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>16</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>17</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>18</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>19</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>20</td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	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
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A.3
(1.5 pt.)

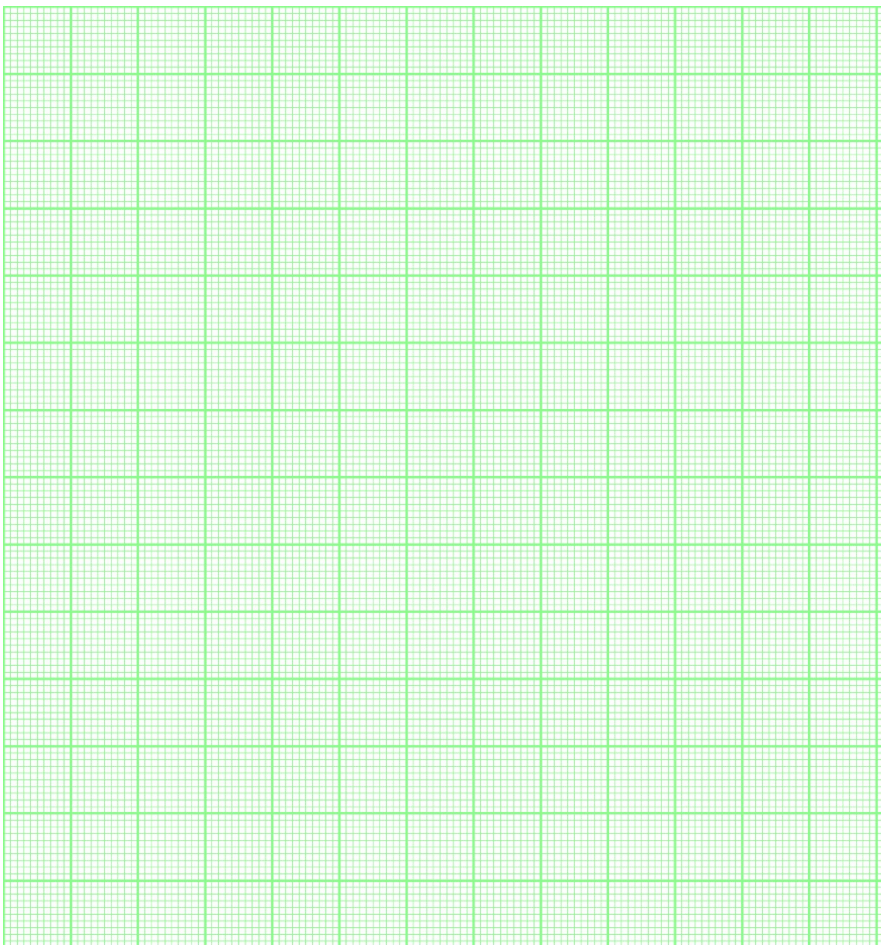
i	Y_i (cm)	dn/dY
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Table 2 of
 $C_0 = 23$ g/150
mL

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AE1

A.3		<p>Plot</p> <p>$\frac{dn}{dY}$ vs Y</p> <p>$C_0 = 23 \text{ g/150 mL}$</p>
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A.3	<table border="1" style="width: 100%; border-collapse: collapse; margin: 0 auto;"> <thead> <tr> <th style="width: 10%;">i</th> <th style="width: 40%;">Y_i (cm)</th> <th style="width: 50%;">dn/dY</th> </tr> </thead> <tbody> <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> <tr><td>7</td><td></td><td></td></tr> <tr><td>8</td><td></td><td></td></tr> <tr><td>9</td><td></td><td></td></tr> <tr><td>10</td><td></td><td></td></tr> <tr><td>11</td><td></td><td></td></tr> <tr><td>12</td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </tbody> </table>	i	Y_i (cm)	dn/dY	1			2			3			4			5			6			7			8			9			10			11			12						<p>Table 2 of</p> <p>$C_0 = 28 \text{ g/150 mL}$</p>
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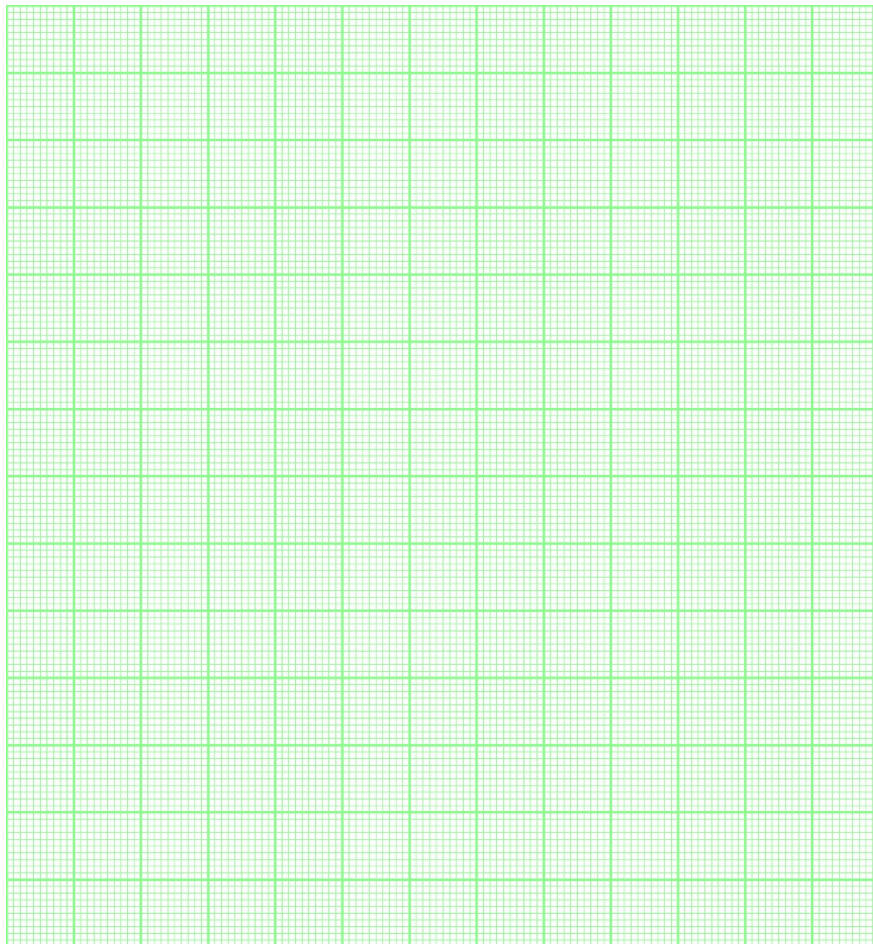
Experiment

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AE1

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A.3



Plot

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

$$C_0 = 28 \text{ g/150 mL}$$

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A.3

i	Y_i (cm)	dn/dY
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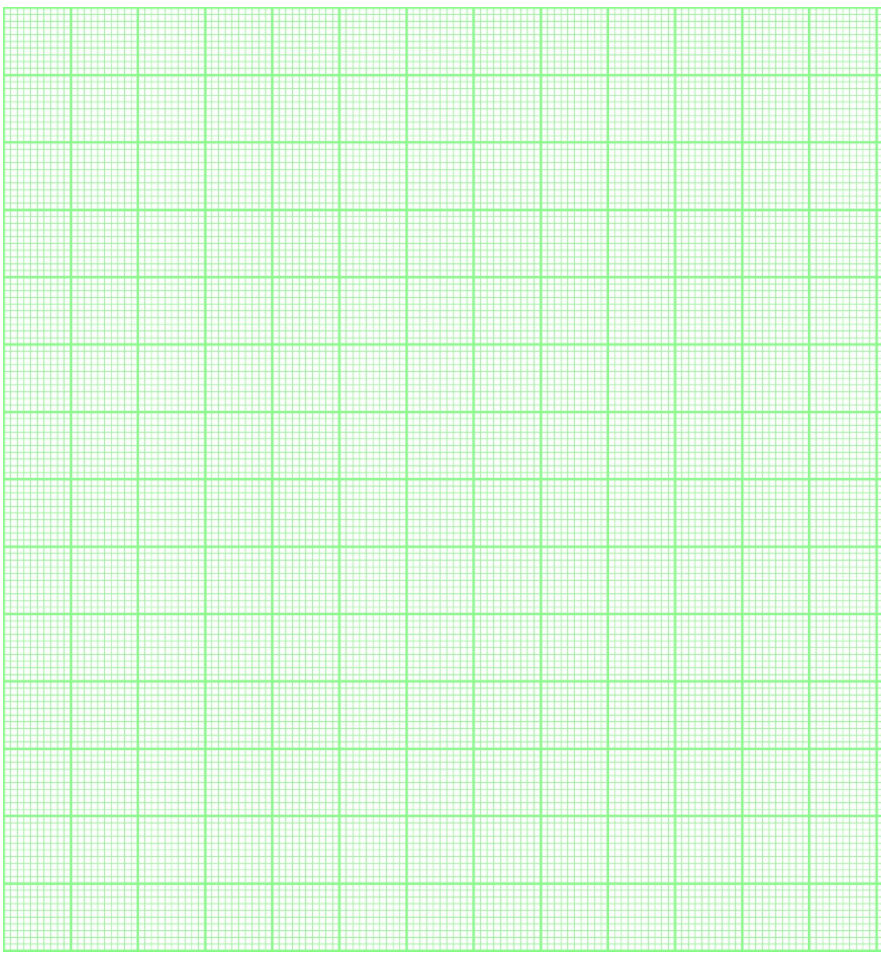
Table 2 of

$C_0 = 33$ g/150
mL

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A.3		Plot $\frac{dn}{dY}$ vs Y $C_0 = 33 \text{ g}/150 \text{ mL}$
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	

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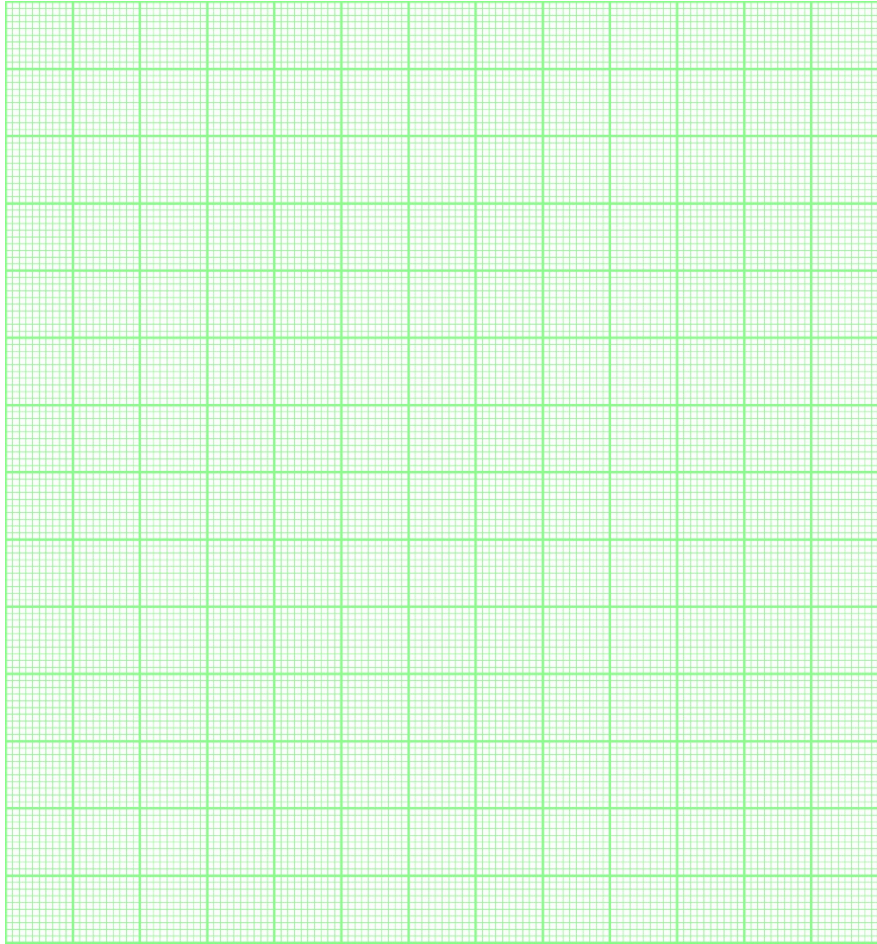
B: 确定扩散系数 (4.2 points)

Question	Answer	Marks																																																															
B.1 (0.9 pt.)	eq.(3)的线性形式																																																																
B.2 (1.8 pt.)	<table border="1"><thead><tr><th>i</th><th></th><th></th></tr></thead><tbody><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><tr><td>7</td><td></td><td></td></tr><tr><td>8</td><td></td><td></td></tr><tr><td>9</td><td></td><td></td></tr><tr><td>10</td><td></td><td></td></tr><tr><td>11</td><td></td><td></td></tr><tr><td>12</td><td></td><td></td></tr><tr><td>13</td><td></td><td></td></tr><tr><td>14</td><td></td><td></td></tr><tr><td>15</td><td></td><td></td></tr><tr><td>16</td><td></td><td></td></tr><tr><td>17</td><td></td><td></td></tr><tr><td>18</td><td></td><td></td></tr><tr><td>19</td><td></td><td></td></tr><tr><td>20</td><td></td><td></td></tr></tbody></table>	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 = 23 g/150 mL
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B.2		Plot of Table 3 $C_0 = 23 \text{ g/150 mL}$																																																															

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m (slope of the graph 图像的斜率) =

B.2

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Table 3 of C_0
= 28 g/150 mL

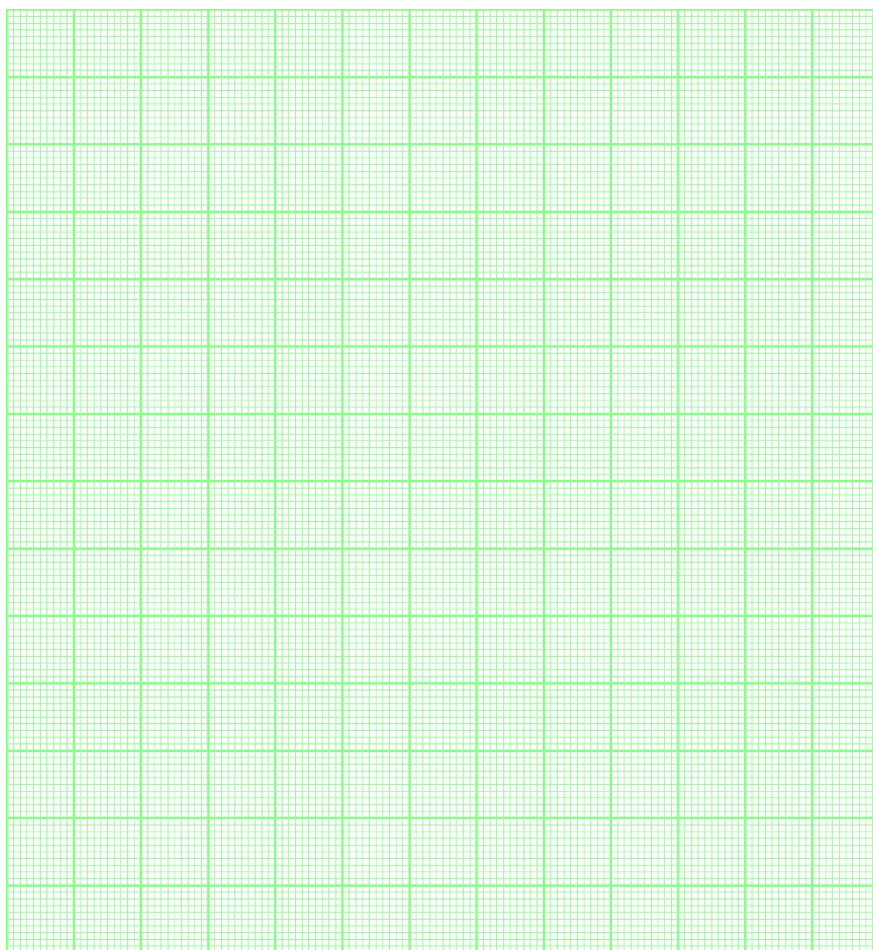
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AE1

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B.2



Plot of
Table 3
 $C_0 = 28 \text{ g/150 mL}$

m (slope of the graph) =

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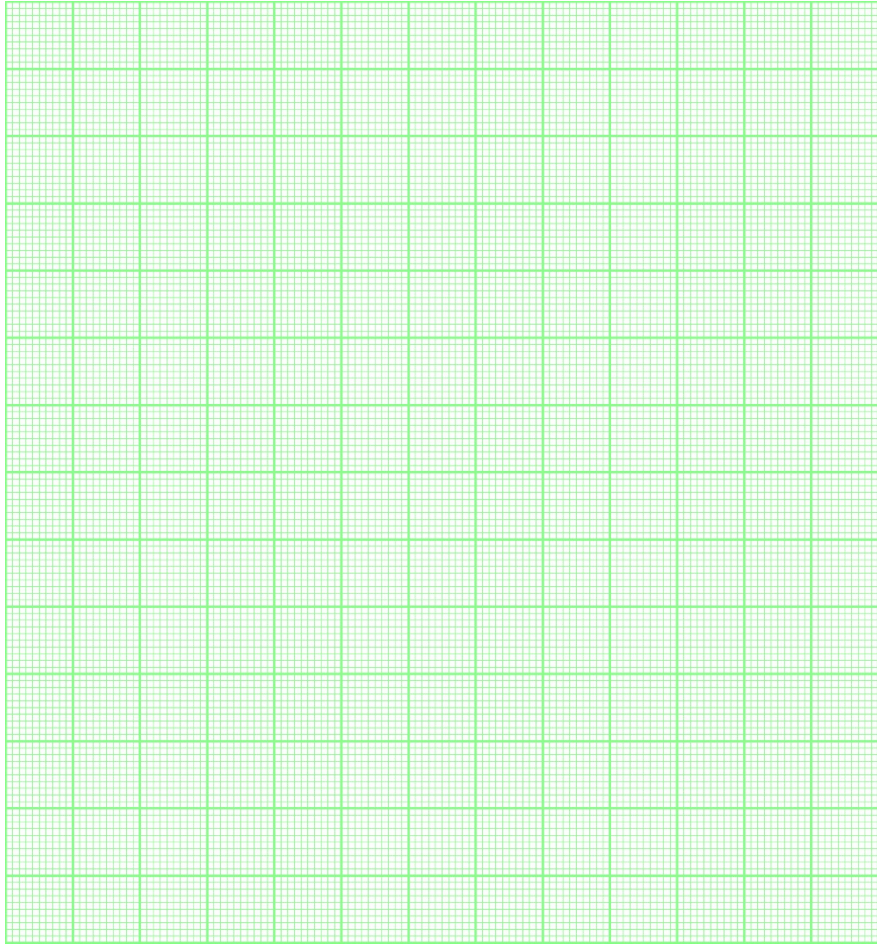
AE1

B.2	<table border="1"><thead><tr><th>t</th><th></th><th></th></tr></thead><tbody><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><tr><td>7</td><td></td><td></td></tr><tr><td>8</td><td></td><td></td></tr><tr><td>9</td><td></td><td></td></tr><tr><td>10</td><td></td><td></td></tr><tr><td>11</td><td></td><td></td></tr><tr><td>12</td><td></td><td></td></tr><tr><td>13</td><td></td><td></td></tr><tr><td>14</td><td></td><td></td></tr><tr><td>15</td><td></td><td></td></tr><tr><td>16</td><td></td><td></td></tr><tr><td>17</td><td></td><td></td></tr><tr><td>18</td><td></td><td></td></tr><tr><td>19</td><td></td><td></td></tr><tr><td>20</td><td></td><td></td></tr></tbody></table>	t			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
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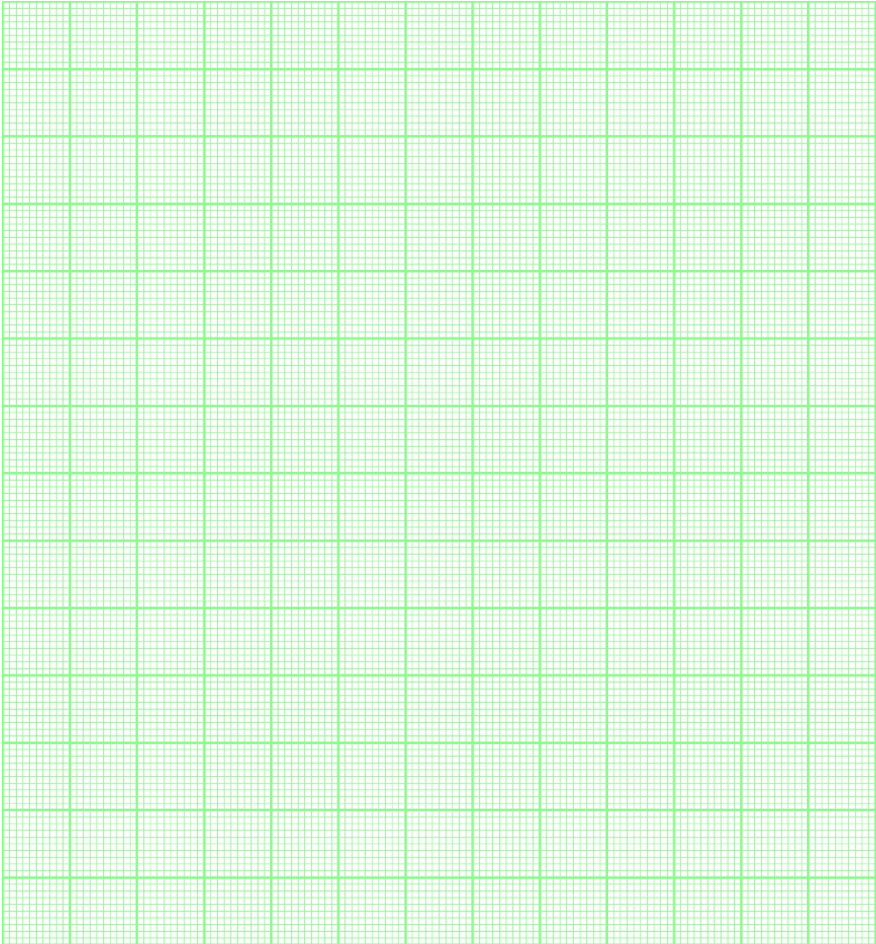
AE1



m (slope of the graph) =

<p>B.3 (1.5 pt.)</p>	<p>D of 23 g/150 mL = cm^2/s</p> <p>D of 28 g/150 mL = cm^2/s</p> <p>D of 33 g/150 mL = cm^2/s</p>	
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C. 非线性扩散 (1.3 points)

Question	Answer	Marks
C.1 (1.3 pt.)		Plot D vs. C_0
C.1	扩散系数随盐溶液浓度的变化率为:	