

22nd INTERNATIONAL BIOLOGY OLYMPIAD

10th — 17th, 2011

Taipei, Taiwan



PRACTICAL TEST 1

BIOCHEMISTRY AND CELL BIOLOGY

Total Points: 100

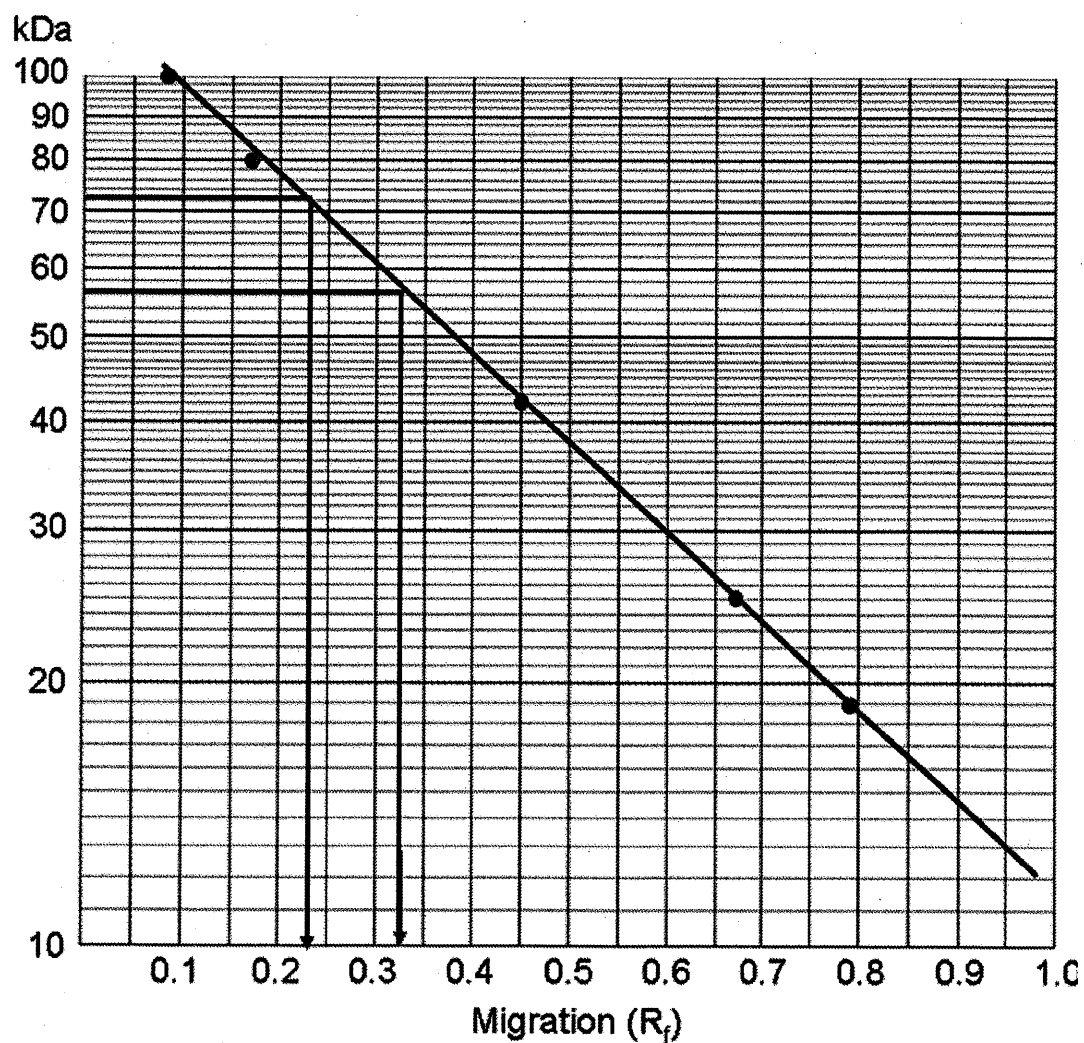
Duration: 90 minutes

ANSWER KEY

Q.1.1. (2 points)

	Start point	Dye-front
Anode (+ charge)		X

Q.1.2. (4+4 points)



Protein	Lane A	Lane B
Molecular weight (kDa)	56 (53-59)	72 (68-76)

Q.1.3. (5 points)

	57 kDa	33 kDa
Number	2	4

Q.1.4. (5 points)

	Amino acid	Nucleotide
Number	300	900

Q.1.5. (5 points)

DNA : Protein

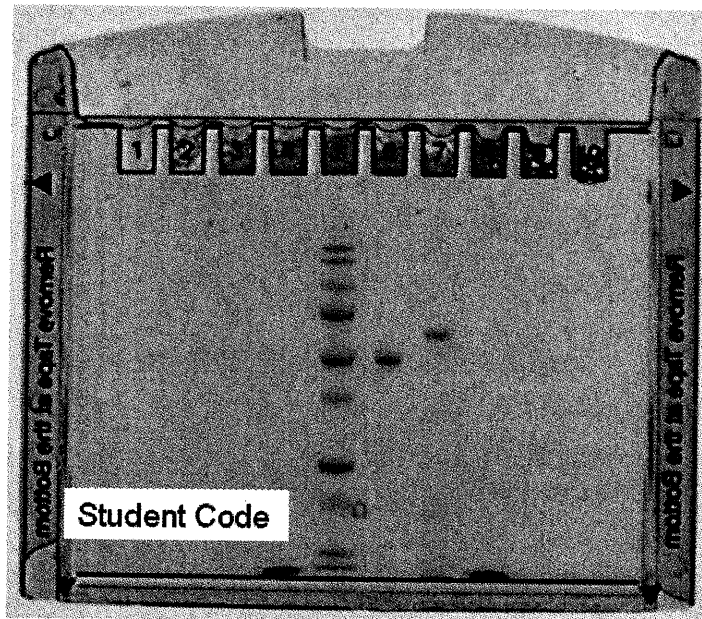
18 : 1

258
359
903
1074
1077

Q.1.6. (5 points)

P : Q = **1 : 2**

Task I photo - protein electrophoresis (5 points)



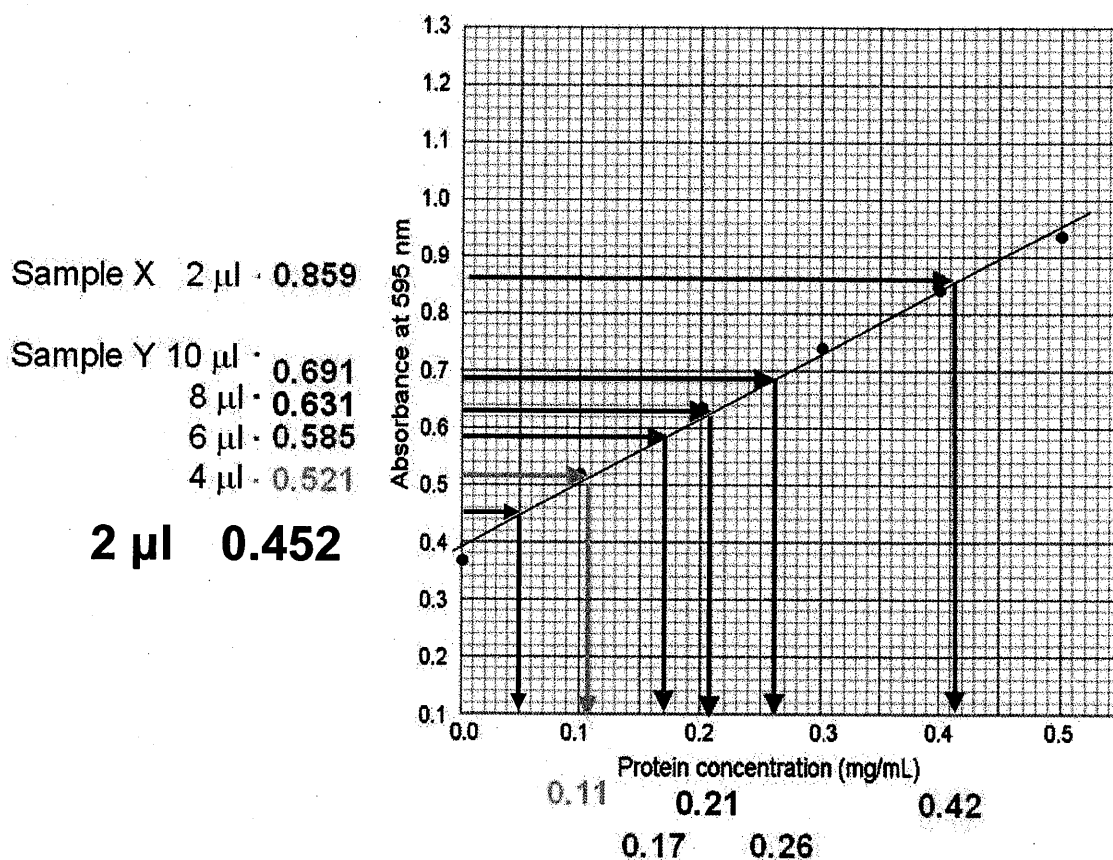
Task II result sheet - Protein quantification

Absorbances		Filter 1: 595nm											
		1	2	3	4	5	6	7	8	9	10	11	12
BSA	A	0.369	0.503	0.635	0.729	0.813	0.935	0.045	0.045	0.044	0.044	0.044	0.045
	B	0.371	0.539	0.634	0.746	0.825	0.929	0.045	0.045	0.044	0.044	0.044	0.044
	C	0.044	0.045	0.044	0.045	0.045	0.044	0.045	0.044	0.044	0.044	0.044	0.044
	D	0.062	0.885	1.121	1.299	1.371	1.412	0.045	0.044	0.044	0.044	0.044	0.044
X	E	0.044	0.833	1.130	1.236	1.314	1.430	0.044	0.044	0.044	0.045	0.044	0.044
	F	0.044	0.044	0.044	0.044	0.044	0.044	0.045	0.044	0.044	0.044	0.044	0.044
	G	0.044	0.445	0.524	0.584	0.634	0.689	0.045	0.045	0.044	0.044	0.044	0.044
	H	0.045	0.459	0.517	0.587	0.628	0.693	0.044	0.044	0.044	0.044	0.045	0.044
Y													

Q.2.1.1. (5 points)

Materials	Well of a microplate					
	A1 & B1	A2 & B2	A3 & B3	A4 & B4	A5 & B5	A6 & B6
0.5 mg/mL BSA (μ L)	0	2	4	6	8	10
H ₂ O (μ L)	10	8	6	4	2	0
Diluted BSA concentration (mg/mL)	0	0.1	0.2	0.3	0.4	0.5

Q.2.1.2. (5 points) Standard curve for BSA



Q.2.2. (12 points)

	Solution X					Solution Y				
Sample volume (μ L)	2	4	6	8	10	2	4	6	8	10
H ₂ O (μ L)	8	6	4	2	0	8	6	4	2	0
Optical density - OD ₅₉₅ nm	0.859					0.452	0.521	0.586	0.631	0.691

out of range

Q.2.3. (8 points)

Concentration of X (mg/mL)	Concentration of Y (mg/mL)
2.0	0.26
(1.6-2.4)	(0.21-0.31)

Q.3.1.1. (5 points)

Tube	A1	A2	A3	B1	B2	B3
Color change				X		

Q.3.1.2. (2 points)

Buffer	A	B
		X

Q.3.2. (5 points)

A	B	C	D	E
X				

Q.3.3. (4 points)

A	B	C	D
	X		

Q.3.4. (5 points)

A	B	C	D	E
				X

Q.3.5. (4 points)

A	B	C	D
X			

Q.3.6. (5 points)

G-10	G-15	G-25	G-50	G-75	G-100	G-150	G-200
			X				

Q.3.7. (5 points)

20