25th INTERNATIONAL BIOLOGY OLYMPIAD

5 – 13 July, 2014

INDONESIA

PRACTICAL TEST 2

PLANT ANATOMY AND PHYSIOLOGY

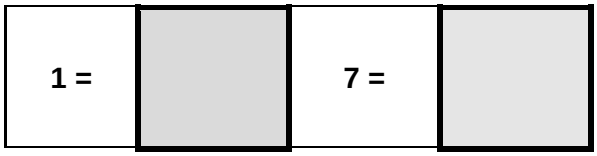
ANSWER KEY

Total points: **96**

Duration: 90 minutes

COUNTRY:	.....
STUDENT:	.....

The answers have to be given either with a tick (√) or with Arabic numbers. The numbers "1" and "7" can look very similar in handwriting. To make sure that those two numbers can be well distinguished by the IBO staff, please write them as you normally would into the following box.



Task 1: Determination of plant pigment (*36 points*)

TLC plate photograph (***4 points***).

Q 1.1 (12 points)

Spot	R*f* values of four major pigments (precision: two places after the decimal point) (@ ***2 point***)	Pigment number from Table 1 (@ ***1 point***)
1		
2		
3		
4		

Q. 1.2 (4 points)

True	False
	√
√	
√	
	√

Q 1.3 (10 points)

Extract	A		Total Chlorophyll (mg/L)	Chlorophyll a (mg/L)	Chlorophyll b (mg/L)
	649 (nm)	665 (nm)			
C					
D					

Q 1.4 (2 points)

Extract	Ratio of chlorophyll
C	
D	

Q 1.5 (4 points)

True	False
√	
	√
√	
√	

Task 2: Determination of starch content in root extract (21 *points*)

Q 2.1 (1 point)

Starch [ppm]	100
Starch solution (µL)	400
H2O (µL)	600

Q 2.2 (8 points)

Sample	Absorbance (580 nm)
Starch 250 ppm (C4)	
Starch 100 ppm (C6)	
Sample C7	
Sample C8	

Q 2.3 (4 points)

a: ……..

Q 2.4 (4 points)

Sample	Concentration (ppm)
C7	
C8	

Q 2.5 (4 points)

True	False
√	
	√
√	
√	

Task 3. Observation of structural adaptation in plants (39 Points)

Q 3.1 (6 points @ 0.5 point)

Tissue type	Presence		
Specimen	**X**	**Y**	**Z**
Cortex			
a. sclerenchyma	+	+	-
Endodermis	+	+	+
Xylem			
a. primary xylem	+	+	+
b. secondary xylem	-	-	-

Q. 3.2 (9 points)

Specimen	Diagram (number)
X	4
Y	2
Z	6

Q 3.3 (9 points)

Specimen	No aerenchyma	Lysigenous*	Schizogenous**
X	√		
Y		√	
Z			√

* This type of intercellular space arises through dissolution of entire cells.
** This type of intercellular space arises through separation of cell walls from each other along more or less extended areas of their contact.

Q 3.4 (9 points)

Organ	Monocotyledonous			Dicotyledonous		
	Root	Stem	Leaf	Root	Stem	Leaf
X	√					
Y	√					
Z				√		

Q 3.5 (6 points)

Specimen	Control	Flooding
X	√	
Y		√
Z		√

End of the Practical Exam