

## Answer Key to the Theoretical Tests

### 1. Part A

No.	A	B	C	D	E	F	No.	A	B	C	D	E	F	No.	A	B	C	D	E	F	
A1					X		A21		X					A41	X						
A2		X					A22			X				A42							X
A3			X				A23	X						A43			X				
A4					X		A24			X				A44		X					
A5				X			A25				X			A45		X					
A6					X		A26		X					A46		X					
A7				X			A27	X						A47							X
A8				X			A28			X				A48		X					
A9					X		A29		X					A49						X	
A10			X				A30				X			A50			X				
A11			X				A31			X				A51				X			
A12			X				A32			X				A52				X			
A13			X				A33				X			A53		X					
A14			X				A34			X				A54							X
A15			X				A35						X								
A16			X				A36				X										
A17				X			A37			X											
A18		X					A38			X											
A19			X				A39			X											
A20					X		A40				X										

## 2. Part B

### B1. (0.5 points x 6 = 3 points)

	A	B	C	D	E	F
Plants		X		X		
Mammals	X		X		X	X

### B2. (0.5 points x 5 = 2.5 points)

I	II	III	IV	V
D	C	E	B	A

### B3. (0.5 points x 6 = 3 points)

$$\frac{735}{3} \times 122 - \left\{ \left( \frac{735}{3} - 1 \right) \times 18 \right\} - \{ 5 \times (2 \times 1) \}$$

$$= 245 \times 122 - 244 \times 18 - 5 \times 2$$

$$= 29890 - 4392 - 10$$

$$= 25488$$

When the N-terminal Met residue is assumed to have been removed,

$$\left( \frac{735}{3} - 1 \right) \times 122 - \left\{ \left( \frac{735}{3} - 1 - 1 \right) \times 18 \right\} - \{ 5 \times (2 \times 1) \}$$

$$= 244 \times 122 - 243 \times 18 - 5 \times 2$$

$$= 29768 - 4374 - 10$$

$$= 25384$$

Partial point:

- (0.5) Division by 3.
- (0.5) Subtraction of water mass of peptide bonds.
- (0.5) Number of peptide bonds: number of amino acids *minus* 1.
- (0.5) Correct molecular mass of one water molecule.
- (0.5) Subtraction of ten hydrogen molecules of five disulfide bonds.
- (0.5) Correct calculations.

### B4. (3.5 points)

(1) (0.3 points x 10 = 3 points)

A	<b>6</b>
B	<b>1, 3, 7, 10</b>
C	
D	<b>4, 9</b>
E	<b>2, 5, 8</b>
F	

(2) (0.5 point : if all are correct)

1	2	3
<b>B</b>	<b>C</b>	<b>A</b>

**B5. (0.5 points x 4 = 2 points)**

I	II	III	IV
<b>D</b>	<b>A</b>	<b>C</b>	<b>B</b>

**B6. (3 points)**

<b>2000</b>
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(or 2007 by using more precise Avogadro's number.)

**B7. (1 points x 4 = 4 points)**

I	II	III	IV
<b>A</b>	<b>F</b>	<b>E</b>	<b>A</b>

**B8. (3 points)**

	Deficiency symptoms (0.3x3)	Mineral mobility (0.3x3)	Metabolic roles (0.4x3)
Mg	<b>B</b>	<b>C</b>	<b>G</b>
Fe	<b>A</b>	<b>D</b>	<b>E</b>
N	<b>B</b>	<b>C</b>	<b>F</b>

**B9. (1 points x 3 = 3 points)**

I	II	III
<b>C</b>	<b>D</b>	<b>F</b>

**B10. (4 points)**

(1) (0.5 points x 4 = 2 points)

		can respond to Florigen.	cannot respond to Florigen.
The shoot apical meristems of	cold-treated annual plants	<b>X</b>	
	untreated annual plants	<b>X</b>	
	cold-treated biennial plants	<b>X</b>	
	untreated biennial plants	<b>X</b>	

(2) (0.5 points x 4 = 2 points)

		produce Florigen under the long-day condition.	do not produce Florigen in either photoperiodic condition.
The leaves of	cold-treated annual plants	<b>X</b>	
	untreated annual plants	<b>X</b>	
	cold-treated biennial plants	<b>X</b>	
	untreated biennial plants		<b>X</b>

**B11. (3 points)**

(1) (1 point)

A	B	C	D
		<b>X</b>	

(2) (1 point)

A	B	C	D
		<b>X</b>	

(3) (1 point)

A	B	C	D
			<b>X</b>

**B12. (1 points x 3 = 3 points)**

	A	B	C
I	<b>X</b>		
II		<b>X</b>	
III	<b>X</b>		

**B13. (1 points x 3 = 3 points)**

I	II	III
<b>A</b>	<b>C</b>	<b>B</b>

**B14. (2.5 points)**

(1) (0.5 point)

A	B
	<b>X</b>

(2) (0.5 point)

A	B	C	D
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		<b>X</b>	
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(3) (0.5 points x 3 = 1.5 points)

<b>C</b>	<b>E</b>	<b>G</b>
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**B15. (1 points x 4 = 4 points)**

	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4
Rejected	<b>X</b>	<b>X</b>		
Not rejected			<b>X</b>	<b>X</b>

**B16. (2 points)**

(1) (1 point)

A	B	C	D	E
	<b>X</b>			

(2) (1 point)

A	B	C	D	E
<b>X</b>				

**B17. (2 points)**

(1) (0.2 point x 4 = 0.8 points)

	A	B	C	D
TRUE	<b>X</b>	<b>X</b>		<b>X</b>
FALSE			<b>X</b>	

(2) (0.3 points x 4 = 1.2 points)

	A	B	C	D
TRUE	<b>X</b>		<b>X</b>	<b>X</b>
FALSE		<b>X</b>		

**B18. (3 points)**

(1) (1 points x 2 = 2 points)

A	B	C	D	E
<b>X</b>			<b>X</b>	

(Choosing more than 2 gives no point.)

(2) (1 point)

A	B	C	D
			<b>X</b>

**B19. (3 points)**

(1) (0.5 point)

A	B	C	D	E
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			<b>X</b>	
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(2) (0.5 point)

A	B	C	D
			<b>X</b>

(2) (1 points x 2 = 2 points)

A	B	C	D	E	F
		<b>X</b>		<b>X</b>	

(Choosing more than 2 gives no point.)

**B20. (3 points)**

(1) (1 points x 2 = 2 points)

Acc	<b>190</b>	m
Aml	<b>340</b>	m

(2) (1 point)

A	B	C	D
	<b>X</b>		

**B21. (0.5 points x 4 = 2 points)**

i	ii	iii	iv
<b>C</b>	<b>D</b>	<b>B</b>	<b>A</b>

**B22. (2 points)**

(1) (1 point)

A	B	C	D
	<b>X</b>		

(2) (1 point)

A	B	C	D	E	F
<b>X</b>					

**B23. (4 points)**

(1) (2 points)

A	B	C	D	E	F
	<b>X</b>				

(2) (2 points)

A	B	C	D	E
		<b>X</b>		

**B24. (4 points)**

(1) (1 point)

A	B	C	D	E
	X			

(2) (1 point)

A	B	C	D	E
		X		

(3) (2 points)

26	%
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**B25. (3 points)**

(1) (2 points)

2.5	X	$10^6$
(2,500,000)		years

$5 \times 10^6$  (5,000,000) years: 1 point

(2) (1 point)

A	B	C
		X

**B26. (3 points)**

(1) (1 point)

A	B	C	D
			X

(2) (1 point)

A	B	C	D
			X

(3) (1 point)

A	B	C	D
		X	

**B27. (4 points)**

(1) (2 points)

34	%
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or 0.34

(2) (1 point)

I	II	III	IV
			X

(3) (1 point)

A	B	C	D
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X			
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**B28. (1 points x 3 = 3 points)**

A	B	C	D	E	F	G	H
	X			X	X		

**B29. (3 points)**

(1) (0.5 point x 2 = 1 points)

A	B	C	D	E	F	G
		X	X			

(Choosing more than 2 gives no point.)

(2) (1 point)

A	B	C	D	E	F	G
	X					

(3) (1 point)

A	B	C	D	E	F	G
X						

**B30. (1 points x 3 = 3 points)**

I	II	III
D	C	B

**B31. (0.5 points x 5 = 2.5 points)**

	A	B	C	D	E
TRUE	X	X		X	
FALSE			X		X

**B32. (1 points x 3 = 3 points)**

	A	B	C
TRUE			X
FALSE	X	X	

**B33. (0.5 points x 6 = 3 points)**

I	II	III	IV	V	VI
D	C	B	D	E	B

**B34. (5 points)**

(1) (1 point)

A	B	C	D	E	F	G	H
		X					



(2) (0.5 points x 6 = 3 points)

	Domain I	Domain II	Function
Older	<b>3</b>	<b>1</b>	<b>4</b>
Newer	<b>1</b>	<b>4</b>	<b>1</b>

(3) (1 point: if all are correct)

I	II	III
<b>B</b>	<b>C</b>	<b>A</b>

**B35. (4 points)**

(1) (2 points)

A	B	C
	<b>X</b>	

(2) (1 point)

<b>2, 6</b>
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Since the number of correct choice is not stated in the question, the points are calculated by (number of the correct answer) x 0.5 – (number of the wrong answer) x 0.3.

(3) (1 point)

A	B	C	D	E	F	G	H	I
				<b>X</b>				

Since the answer of (3) is consequence of the question (1), the combination of the wrong answer (1) A and the answer of (3) B gives 0.5 point for (3), and that of (1) C and (3) H, gives 0.5 point for (3).