

Biology 12  
 2009/10 Released Exam  
 January 2010 — Form A  
 Provincial Examination — Answer Key

Cognitive Processes	Weightings	Question Types
<b>K</b> = Knowledge	22%	<b>67</b> = Multiple Choice (MC)
<b>U</b> = Understanding	58%	<b>6</b> = Written Response (WR)
<b>H</b> = Higher Mental Processes	20%	

Topics	Prescribed Learning Outcomes (PLOs)	Weightings
1. Cell Biology	B1–B6	18%
2. Processes of Science and Cell Biology	A2; B7–11	18%
3. Human Biology	C1–C15	64%

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
1.	C	K	1	1	B2	MC
2.	D	U	1	1	B4	MC
3.	D	K	1	1	B4	MC
4.	B	H	1	1	B1	MC
5.	B	H	1	1	B4	MC
6.	D	K	1	1	B6	MC
7.	B	U	1	1	B5	MC
8.	A	K	1	1	B5	MC
9.	B	H	1	1	B5	MC
10.	B	U	1	1	B9	MC
11.	D	U	1	1	B10	MC

<b>Question Number</b>	<b>Keyed Response</b>	<b>Cognitive Process</b>	<b>Mark</b>	<b>Topic</b>	<b>PLO</b>	<b>Question Type</b>
12.	A	U	1	2	B9	MC
13.	A	U	1	2	B9	MC
14.	D	U	1	2	B9	MC
15.	B	H	1	2	B9	MC
16.	C	H	1	2	B11	MC
17.	B	U	1	2	B11	MC
18.	C	U	1	2	B11	MC
19.	A	H	1	2	B11	MC
20.	D	K	1	2	B11	MC
21.	A	U	1	2	B11	MC
22.	C	U	1	3	C1	MC
23.	C	H	1	3	C1	MC

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
24.	B	U	1	3	C1	MC
25.	B	H	1	3	C2	MC
26.	C	K	1	3	C5	MC
27.	D	K	1	3	C6	MC
28.	B	K	1	3	C5	MC
29.	B	U	1	3	C3	MC
30.	A	U	1	3	C5	MC
31.	C	U	1	3	C5	MC
32.	A	H	1	3	C5	MC
33.	B	K	1	3	C7	MC
34.	B	U	1	3	C5	MC
35.	C	H	1	3	C4	MC
36.	A	K	1	3	C8	MC
37.	C	K	1	3	C8	MC
38.	A	U	1	3	C10	MC
39.	D	H	1	3	C10	MC
40.	C	U	1	3	C9	MC
41.	A	U	1	3	C9	MC
42.	D	H	1	3	C10	MC
43.	A	K	1	3	C12	MC
44.	C	K	1	3	C11	MC
45.	D	U	1	3	C12	MC
46.	B	U	1	3	C12	MC
47.	C	U	1	3	C11	MC
48.	C	U	1	3	C12	MC

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<b>Question Number</b>	<b>Keyed Response</b>	<b>Cognitive Process</b>	<b>Mark</b>	<b>Topic</b>	<b>PLO</b>	<b>Question Type</b>
49.	C	H	1	3	C11	MC
50.	A	H	1	3	C11	MC
51.	C	U	1	3	C11	MC
52.	B	U	1	3	C12	MC
53.	B	K	1	3	C13	MC
54.	D	K	1	3	C13	MC
55.	B	H	1	3	C13	MC
56.	C	H	1	3	C13	MC
57.	B	U	1	3	C13	MC
58.	B	K	1	3	C14	MC
59.	A	U	1	3	C14	MC
60.	D	U	1	3	C14	MC
61.	A	K	1	3	C15	MC
62.	B	U	1	3	C15	MC
63.	D	U	1	3	C15	MC
64.	A	H	1	3	C15	MC
65.	B	U	1	3	C15	MC
66.	A	H	1	3	C15	MC
67.	B	H	1	3	C15	MC

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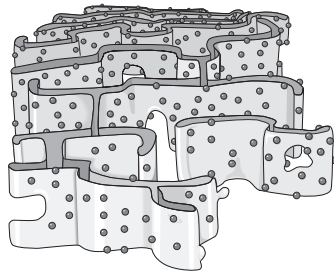
<b>Question Number</b>	<b>Keyed Response</b>	<b>Cognitive Process</b>	<b>Mark</b>	<b>Topic</b>	<b>PLO</b>	<b>Question Type</b>
1.	–	U	4	1	B1	WR
2.	–	U	3	1	B2	WR
3.	–	U	4	2	B7	WR
4.	–	K	3	3	C1	WR
		U	2	3	C2	
5.	–	U	3	3	C4	WR
6.	–	U	4	3	C13	WR

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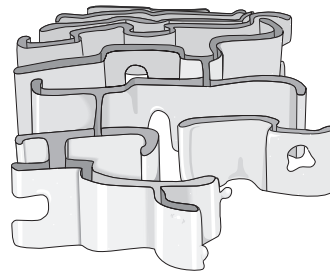
Provincial Examination — Scoring Guide

Use the following diagram to answer question 1.

Organelle 1



Organelle 2



1. Identify organelles 1 and 2 and compare their functions in at least two ways.

(4 marks)

**KEY**

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- **Organelle 1 is the rough endoplasmic reticulum (ER) (1 mark) and organelle 2 is the smooth endoplasmic reticulum (ER) (1 mark).**

**AND**

- **Rough ER synthesizes and processes protein and smooth ER does not.**
- **Smooth ER synthesizes steroids and rough ER does not.**
- **Smooth ER detoxifies poisons and rough ER does not.**

} any 2 for  
1 mark each

**Note to markers: Only valid comparisons should receive a mark.**

2. Explain how the structure of water molecules allow this substance to be an effective temperature regulator. Give an example of this regulation in the human body.

**(3 marks)**

**KEY**

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- **Water can absorb or release large amounts of heat energy without a significant change in temperature. (1 mark)**
- **The hydrogen bond between an oxygen atom and a hydrogen atom on another water molecule stores this energy. (1 mark)**

**Examples include:**

- **sweating cools the body.**
- **body/blood temperature remains relatively constant.**

} **any for**  
} **1 mark**

3. Describe the process of translation.

(4 marks)

**KEY**

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- The “start” codon (AUG) causes the ribosomal subunits to attach to the mRNA molecule. (1 mark)
- tRNA molecule brings amino acid to ribosome. (1 mark)
- The ribosome moves along the mRNA molecule (1 mark), and matches complementary codons and anticodons. (1 mark)
- Amino acid from the tRNA is added to the growing polypeptide chain. (1 mark)
- Peptide bonds are formed between amino acids.
- Upon reaching the stop codon, the polypeptide chain is released and the ribosomal subunits come apart. (1 mark)

} any four for  
1 mark each



4. Explain how the liver, gall bladder and pancreas work together during digestion.

(5 marks)

**KEY**

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- **The liver produces bile.**
- **Bile is stored in the gall bladder.**
- **Gall bladder releases bile when chyme enters the duodenum.**
- **Bile emulsifies fat which results in greater surface area. This increases the rate of chemical digestion.**
- **The pancreas secretes lipase.**
- **Lipase hydrolyzes fat into fatty acids and glycerol.**
- **The pancreas secretes sodium bicarbonate.**
- **Bicarbonate ions neutralize acid chyme, ensuring the correct pH for digestion of lipids.**

} **any five for  
1 mark each**

5. Explain how the nervous system lowers blood pressure after a “fight or flight” response. (3 marks)

**KEY**

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- The parasympathetic nervous system slows the heartbeat, decreasing output and lowering pressure.
  - Strength of ventricular contraction is reduced, lowering the pressure due to lessened force.
  - The smooth muscle of the arteries relaxes and increases the size of the lumen.
  - The sphincters around the arterioles relax, allowing more blood to flow to different areas of the body.
  - This increases the size of the space blood flows into and reduces the volume of blood flowing in an artery (1 mark), causing the blood pressure to drop. (1 mark)
- } any three for  
1 mark each

6. Explain how the consumption of alcohol and the resulting decrease in the secretion of anti-diuretic hormone (ADH) affects both blood pressure and thirst.

**(4 marks)**

**KEY**

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- **Decreased antidiuretic hormone (ADH) results in decreased reabsorption of water. (1 mark)**
- **Decreased reabsorption of water results in decreased blood volume (1 mark) and therefore decreased blood pressure. (1 mark)**
- **Decreased reabsorption of water results in an increased solute concentration in the blood (1 mark) which is sensed by osmoreceptors in the hypothalamus. (1 mark)**
- **The osmoreceptors stimulate thirst, causing the person to increase liquid intake. (1 mark)**

**any four for  
1 mark each**