

Biology 12
August 2007 — Form A
 Provincial Examination — Multiple-Choice Key

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

Topics	Prescribed Learning Outcomes (PLOs)	Weightings
1. Cell Biology	A, B, C, D	18%
2. Cell Processes and Applications	E, F, G, H	18%
3. Human Biology	I, J, K, L, M, N, O, P	64%

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
1.	C	K	1	1	A1	MC
2.	A	U	1	1	A1	MC
3.	D	U	1	1	A1	MC
4.	B	H	1	1	A1	MC
5.	C	U	1	1	B3	MC
6.	C	U	1	1	B3	MC
7.	D	U	1	1	C1	MC
8.	B	U	1	1	C2	MC
9.	C	H	1	1	C3	MC
10.	D	K	1	1	C6	MC
11.	B	K	1	1	C11	MC
12.	B	U	1	1	D1	MC
13.	A	K	1	1	D5	MC

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
14.	C	U	1	2	E1	MC
15.	D	H	1	2	E1	MC
16.	C	H	1	2	E1	MC
17.	C	K	1	2	E1	MC
18.	A	H	1	2	E2	MC
19.	B	K	1	2	G1	MC
20.	D	U	1	2	G1	MC
21.	C	U	1	2	G3	MC
22.	B	U	1	2	G5	MC
23.	A	U	1	2	G6	MC
24.	A	H	1	2	G6	MC
25.	B	K	1	2	H1	MC
26.	B	U	1	2	H1	MC
27.	D	U	1	2	H1	MC
28.	C	H	1	2	H3	MC
29.	B	U	1	2	H3	MC

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
30.	D	K	1	3	I1	MC
31.	C	U	1	3	I1	MC
32.	B	K	1	3	I2	MC
33.	C	U	1	3	I2	MC
34.	D	H	1	3	I5	MC
35.	B	U	1	3	J8	MC
36.	A	K	1	3	J2	MC
37.	C	H	1	3	J2	MC
38.	A	U	1	3	J2	MC
39.	A	U	1	3	J2	MC
40.	C	U	1	3	J9	MC
41.	D	U	1	3	J9	MC
42.	B	K	1	3	K1	MC
43.	A	K	1	3	K6	MC
44.	B	K	1	3	L1	MC
45.	A	K	1	3	L2	MC
46.	B	K	1	3	L3	MC
47.	A	U	1	3	L4	MC
48.	B	U	1	3	L8	MC
49.	A	U	1	3	L3	MC
50.	B	H	1	3	L6	MC

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
51.	C	K	1	3	M2	MC
52.	C	U	1	3	M2	MC
53.	A	U	1	3	M3	MC
54.	A	U	1	3	M3	MC
55.	B	H	1	3	M6	MC
56.	A	U	1	3	M8	MC
57.	D	K	1	3	N4	MC
58.	C	K	1	3	O1	MC
59.	D	K	1	3	O1	MC
60.	B	U	1	3	O2	MC
61.	B	H	1	3	O2	MC
62.	A	U	1	3	O2	MC
63.	D	K	1	3	P7	MC
64.	C	U	1	3	P9	MC
65.	A	K	1	3	P10	MC
66.	C	H	1	3	P11	MC
67.	A	H	1	3	P12	MC

Biology 12

August 2007

Provincial Examination — Written-Response Key

Cognitive Processes

K = Knowledge

U = Understanding

H = Higher Mental Processes

Weightings

22%

58%

20%

Question Types

67 = Multiple Choice (MC)

6 = Written Response (WR)

Topics

1. Cell Biology

2. Cell Processes and Applications

3. Human Biology

Prescribed Learning Outcomes (PLOs)

A, B, C, D

E, F, G, H

I, J, K, L, M, N, O, P

Weightings

18%

18%

64%

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
1.	–	U	3	1	D2	WR
2.	–	U	4	3	I2, 1, 4	WR
3.	–	H	4	3	J12	WR
4.	–	U	3	3	M5, 6; J12	WR
5.	–	U	4	3	O5	WR
6.	–	U	5	3	P6, 9, 10	WR

1. (3 marks)

Describe the steps involved when a DNA molecule is copied.

KEY

- **The DNA molecule's double helix is unwound.**
- **Hydrogen bonds between nucleotides are broken, separating the strands of the helix.**
- **Complementary nucleotides attach to the original nucleotides in each strand.**
- **New nucleotides are linked together by bonds thus forming new strands complementary to the original strands.**

} any three for
1 mark each

2. (4 marks)

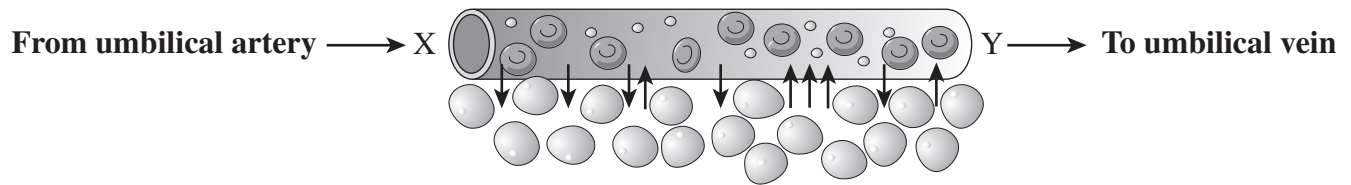
Compare the chemical composition of the contents of the stomach one hour after eating a meal containing proteins, carbohydrates and fats, to the contents of the small intestine several hours later.

KEY

- **The stomach is acidic while the small intestine is basic.**
- **The stomach contains protein molecules while the small intestine contains peptides and amino acids.**
- **The stomach contains fat molecules while the small intestine contains fatty acid and glycerol molecules.**
- **The small intestine contains glucose molecules while the stomach does not.**
- **Any valid enzyme addition (e.g., pepsin is found in the stomach while trypsin is found in the small intestine).**

} any four for
1 mark each

Use the following diagram of blood and tissue cells in the placenta to answer question 3.



3. (4 marks)

Describe the differences in the chemical composition of the blood as it moves from X to Y.

KEY

- Blood at area X contains high levels of bicarbonate ions (HCO_3^-) while blood at area Y contains low levels of HCO_3^- .
- Blood at area X contains high levels of carbaminohemoglobin (HbCO_2) while blood at area Y contains low levels of HbCO_2 .
- Blood at area X contains high levels of reduced hemoglobin (HHb^+) while blood at area Y contains low levels of HHb^+ .
- Blood at area X contains high levels of carbon dioxide (CO_2) while blood at area Y contains low levels of CO_2 .
- Blood at area X contains low levels of nutrients while blood at area Y is rich in nutrients.
- Blood at area Y contains high levels of oxyhemoglobin (HbO_2) while blood at X contains lower levels of HbO_2 .

} any four for
1 mark each

4. (3 marks)

Describe and explain the effect an absence of calcium ions would have on the transmission of an action potential.

KEY

- Calcium ions are required to cause the contraction of protein molecules in the synaptic ending.
- Neurotransmitter molecules are not secreted.
- Without neurotransmitters, the sodium gates in the postsynaptic membrane would not open.
- Depolarization of the postsynaptic membrane would not occur.
- No new nerve impulse would be produced.

} any three for
1 mark each

5. (4 marks)

Explain why excessive aldosterone secretion leads to edema, a condition that results in the swelling of tissues due to retention of fluids.

KEY

- **Aldosterone stimulates the distal convoluted tubule to reabsorb more sodium ions from the filtrate. (1 mark)**
- **Water follows these ions osmotically, raising blood volume. (1 mark)**
- **Increased volume increases blood pressure (1 mark), which forces more blood plasma into the tissue fluids (1 mark).**
- **This increased volume also decreases osmotic pressure (1 mark), causing a decrease in tissue fluid reabsorption, causing swelling (1 mark).**

} any four for
1 mark each

6. (5 marks)

Compare the effects of hormones secreted by the anterior pituitary on the male and female reproductive systems.

KEY

- In males, follicle-stimulating hormone (FSH) targets the cells of the seminiferous tubules (1 mark) and causes sperm production (1 mark).
- In females, FSH targets the ovaries (1 mark) and causes follicle development (1 mark).
- In males, luteinizing hormones (LH) targets the interstitial cells (1 mark) and causes testosterone production (1 mark).
- In females, LH targets the corpus luteum (1 mark) and causes the production of progesterone (1 mark).
- In females, the LH “spike” causes the follicle to release the ovum (ovulation).

} any five for
1 mark each