

Biology 12
 2008/09 Released Exam
 June 2009 — Form A
 Provincial Examination — Answer 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	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	Question Source
1.	C	K	1	1	B1	MC	
2.	D	H	1	1	B1	MC	
3.	C	U	1	1	B1	MC	
4.	C	U	1	1	B1	MC	
5.	B	H	1	1	B1	MC	
6.	B	K	1	1	B4	MC	
7.	A	K	1	1	B4	MC	
8.	C	U	1	1	B4	MC	
9.	D	U	1	1	B4	MC	
10.	B	U	1	1	B4	MC	
11.	C	U	1	1	B4	MC	

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type	Question Source
12.	A	U	1	1	B5	MC	
13.	B	U	1	1	B5	MC	
14.	B	U	1	1	B5	MC	
15.	A	U	1	1	B5	MC	
16.	C	K	1	2	B7	MC	
17.	C	U	1	2	B7	MC	
18.	B	H	1	2	B8	MC	
19.	D	H	1	2	B8	MC	
20.	B	H	1	1	B5	MC	
21.	C	U	1	2	B9	MC	
22.	C	U	1	2	B9	MC	
23.	C	U	1	2	B9	MC	

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type	Question Source
24.	A	U	1	2	B9	MC	
25.	C	U	1	2	B9	MC	
26.	D	H	1	2	B9	MC	
27.	A	H	1	2	B11	MC	
28.	B	U	1	2	B11	MC	
29.	A	K	1	2	B11	MC	
30.	A	K	1	3	C1	MC	
31.	A	K	1	3	C1	MC	
32.	D	U	1	3	C1	MC	
33.	C	U	1	3	C2	MC	
34.	D	U	1	3	C2	MC	
35.	D	U	1	3	C1	MC	
36.	C	U	1	3	C1	MC	
37.	A	H	1	3	C1	MC	
38.	C	H	1	3	C2	MC	
39.	A	K	1	3	C3	MC	
40.	D	U	1	3	C5	MC	
41.	A	K	1	3	C5	MC	
42.	A	K	1	3	C6	MC	
43.	B	U	1	3	C5	MC	
44.	C	U	1	3	C6	MC	
45.	D	H	1	3	C7	MC	
46.	B	H	1	3	C5	MC	
47.	D	H	1	3	C5	MC	
48.	B	K	1	3	C8	MC	

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type	Question Source
49.	A	K	1	3	C8	MC	
50.	A	U	1	3	C9	MC	
51.	C	H	1	3	C9	MC	
52.	B	K	1	3	C11	MC	
53.	C	K	1	3	C11	MC	
54.	D	H	1	3	C11	MC	
55.	B	H	1	3	C11	MC	
56.	B	K	1	3	C13	MC	
57.	D	H	1	3	C13	MC	
58.	B	H	1	3	C13	MC	
59.	A	U	1	3	C13	MC	
60.	B	U	1	3	C13	MC	
61.	C	K	1	3	C13	MC	
62.	B	U	1	3	C14	MC	
63.	C	K	1	3	C14	MC	
64.	A	U	1	3	C14	MC	
65.	B	K	1	3	C14	MC	
66.	C	U	1	3	C14	MC	
67.	B	K	1	3	C15	MC	

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type	Question Source
1.	–	U	3	2	B11	WR	
2.	–	U	4	3	C5	WR	
3.	–	U	3	3	C9	WR	
4.	–	U	6	3	C11	WR	
5.	–	U	3	3	C13	WR	
6.	–	U	2	3	C15	WR	
		H	2		C15		

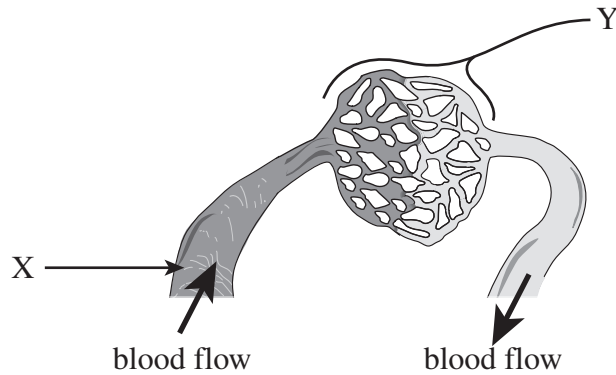
Biology 12
2008/09 Released Exam
June 2009
Provincial Examination — Scoring Guide

1. In an experiment, a reaction catalyzed by a human enzyme is subjected to an increase in temperature from 37°C to 80°C. Describe what happens to the rate of this reaction, and explain why this has occurred. (3 marks)

KEY

- The high temperature denatures the enzyme. (1 mark)
 - This changes the shape of the active site. (1 mark)
 - This prevents the enzyme from joining with the substrate (fewer enzyme-substrate complexes). (1 mark)
 - The rate of the reaction decreases. (1 mark)
- } any 3 for
1 mark each

Use the following diagram to answer question 2.



2. Explain how the structure of blood vessels **X** and **Y** are well-suited to their function. **(4 marks: 2 marks each)**

Vessel X:

- **The artery (or arteriole) has thick, elastic walls (1 mark) which allow the vessel to maintain pressure (1 mark).**
- **Has smooth muscle (1 mark) which contracts and controls blood pressure (1 mark).**
- **Has relatively small internal diameter (1 mark) to maintain blood pressure (1 mark).**
- **Sphincters at the beginnings of capillary beds (1 mark) allow the control of blood flow in the body (1 mark).**

any one for
2 marks

Vessel Y:

- **(The capillary) is one cell layer thick (1 mark) which allows materials to pass through easily (1 mark).**
- **Spaces between cells make capillaries leaky (1 mark) which allow material to be exchanged with tissues (1 mark).**
- **Numerous capillaries increase total cross-sectional area (1 mark) which reduces blood pressure and velocity to allow capillary exchange (1 mark).**

any one for
2 marks

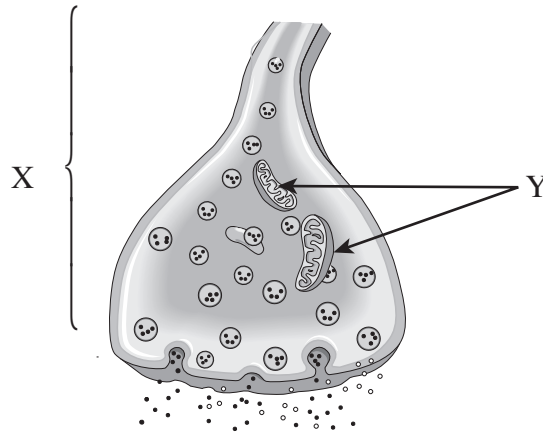
3. Describe how the diaphragm and rib cage function to change the pressure in the thoracic cavity during inhalation.

(3 marks)

KEY

- **The diaphragm pulls down. (1 mark)**
 - **Intercostal muscles contract. (1 mark)**
 - **The rib cage moves up and out. (1 mark)**
- AND**
- **Contraction of the diaphragm and intercostal muscles increases the volume of the thoracic cavity which decreases the pressure. (1 mark)**
- } any 2 for
} 1 mark each

Use the following diagram to answer question 4.



4. By listing reactants and products, describe the chemical process that occurs in structures **Y**. Explain 3 ways in which one of these products is used by structure **X**. **(6 marks)**

KEY

- Glucose and oxygen are used to produce ATP and CO₂.
(any 3 for 1 mark each)
- ATP is used:
 - by contractile proteins to pull vesicles to the membrane.
 - to allow calcium ions to enter the cell.
 - to allow reabsorption of neurotransmitters.
 - to power the sodium-potassium pump.
 - for exocytosis of neurotransmitters.
 - for synthesis of neurotransmitters.

1 mark
each (for
a total of
3 marks)

5. Explain how the nephron regulates blood pH.

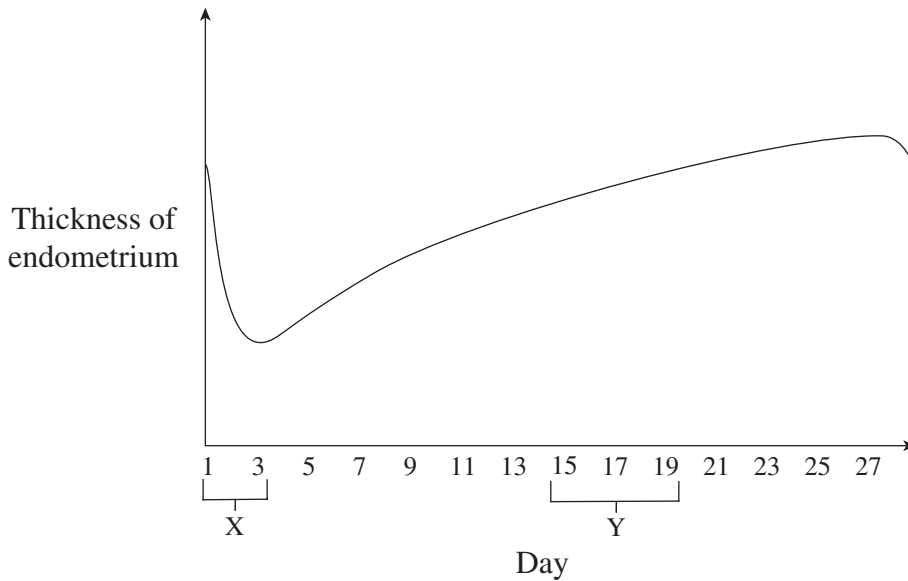
(3 marks)

KEY

- The distal convoluted tubule moves hydrogen ions into the filtrate from the blood by active transport when blood is acidic.
- The rate of this excretion is reduced when blood is more alkaline.
- This movement of hydrogen ions causes the change in pH. The blood pH rises when acidic urine is produced, and blood pH decreases when more alkaline urine is produced.
- Acidic blood leads to the reabsorption of bicarbonate ions from the filtrate.
- When blood is basic, PCT and DCT secrete H (1 mark) and bicarbonate ion reabsorption is decreased (1 mark).

} any three for
1 mark each

Use the following graph to answer question 6.



6. Explain how changes in the secretions of the pituitary gland and the ovaries cause changes in the thickness of the endometrium shown at **X** and **Y**. (4 marks)

KEY

Time X:

- Low levels of progesterone from the ovaries cause menstruation to begin, and the endometrium is shed. (1 mark)
 - The increasing levels of follicle-stimulating hormone (FSH) from the pituitary have no effect on the endometrium at this time.
 - Low levels of follicle-stimulating hormone (FSH) are responsible for low levels of estrogen, so the endometrium is shed.
- } either for
1 mark

Time Y:

- Increased levels of luteinizing hormone (LH) from the pituitary have caused the formation of the corpus luteum, site of progesterone secretion. (1 mark)
 - High levels of progesterone from the ovaries cause the endometrium to increase in thickness.
 - High levels of estrogen continue to stimulate growth of the endometrium.
- } either for
1 mark