Biology 12

November 1997 Provincial Examination

ANSWER KEY / SCORING GUIDE

CURRICULUM:

	Organizers	Sub-Organizers
1.	Cell Biology	A, B, C, D
2.	Cell Processes and Application	E, F, G, H
3.	Human Biology	I, J, K, L, M, N, O, P

Part A: Multiple Choice

Q	K	C	CO	PLO	Q	K	C	CO	PLO
1.	B	H	1	A1	26.	A	U	3	J2, 4; K4
2.	B	K	1	B2	27.	C	K	3	J8
3.	B	U	1	C2	28.	C	U	3	J9
4.	D	U	1	C1, 5	29.	C	K	3	K1
5.	B	H	1	C2; I2	30.	A	H	3	K1, 2, 6
6.	A	U	1	C4	31.	D	H	3	K1, 2, 3
7.	C	K	1	C8	32.	A	U	3	L1
8.	A	U	1	C10	33.	A	K	3	L1, 7
9.	D	H	1	D1, 5	34.	C	U	3	L4
10.	D E L E T E D				35.	D	H	3	L4, 5
11.	A	U	1	D2	36.	D	H	3	L8
12.	B	U	1	D3	37.	B	K	3	L8
13.	C	U	2	E1	38.	D	U	3	M2
14.	A	U	2	E1, 2	39.	C	H	3	M3; G1, 3
15.	A	U	2	E4	40.	C	H	3	M3
16.	D	U	2	G5	41.	C	U	3	N2
17.	A	U	2	G6	42.	C	K	3	O2
18.	C	K	2	H3	43.	D	U	3	O2
19.	C	K	2	H5	44.	A	H	3	O4
20.	A	H	2	H6; I2, 4	45.	C	K	3	O4
21.	B	K	2	H7	46.	B	K	3	P1
22.	B	U	3	M6	47.	B	H	3	P1, 3
23.	D	K	3	I1	48.	A	K	3	P11
24.	D	H	3	I1, 3	49.	D	H	3	P2, 7
25.	B	K	3	J2	50.	C	U	3	P4

Multiple Choice = 50 marks

Part B: Written Response

Q	B	C	S	CO	PLO
1.	1	K	4	1	A1, 2
2.	2	U	5	2	F1, 3, 4
3.	3	U	4	2	G2, 3
4.	4	U	7	3	I2
5.	5	K	6	3	N4
6.	6	U	4	3	I7
7.	7	U	6	3	J9
8.	8	U	8	3	O1, 2, 5
9.	9	H	6	3	P8, 9, 10

Written Response = 50 marks

Multiple Choice = 50 (50 questions)
Written Response = 50 (9 questions)
EXAMINATION TOTAL = 100 marks

LEGEND:
Q = Question Number **B** = Score Box Number **S** = Score
K = Keyed Response **C** = Cognitive Level **CO** = Curriculum Organizer
PLO = Prescribed Learning Outcome

PART B: WRITTEN RESPONSE

Value: 50 marks **Suggested Time: 75 minutes**

INSTRUCTIONS:
1. Use a **pen** for this part of the examination.
2. Write your answers in the space below the questions.
3. Organization and planning space has been incorporated into the space allowed for answering each question.
4. You may not need all of the space provided to answer each question.

1. State **one** function of each of the following. **(4 marks: 1 mark each)**

i) Vesicles:

- **Exocytosis**
- **Endocytosis**
- **Store water, waste, food.**
- **Transport water, waste, food.**

any one for 1 mark

ii) Smooth endoplasmic reticulum:

- **Lipid synthesis.**
- **Steroid production.**
- **Transport molecules.**
- **Detoxifies blood poisons.**

any one for 1 mark

iii) Nuclear envelope:

- **Separates the nuclear material from cytoplasm.**
- **Controls entrance / exit of material into / out of nucleus.**

either one for 1 mark

iv) Mitochondria:

- **Produce ATP.**
- **Aerobic cellular respiration.**

either one for 1 mark

2. Describe the development of cancer in the body.
(5 marks which includes 1 mark for correct sequence)

Initiation
- **Proto-oncogene is converted to an oncogene by an initiator.**

Promotion
- **Promoter causes oncogene containing cell to begin division.**

Tumor Development
- **Anaplasia or undifferentiated growth occurs.**
- **Tumor develops; e.g. cells lack contact inhibition.**
- **New blood vessels grow into developing tumor (vascularization).**

Metastasis
- **Spreading of cancer cells may occur.**

any 4 for 1 mark each

3. a) Explain why a cell membrane is described as *selectively permeable*. **(1 mark)**

- **It allows only certain molecules to pass through it; that is, only selected molecules or ions.** } **1 mark**

b) Describe how the structure of the cell membrane permits molecules to enter the cell by the following processes. **(3 marks: 1 mark each)**

i) Osmosis:

- **Water is not soluble, therefore water cannot enter through phospholipid layer, but enters through pores.** } **1 mark**

ii) Facilitated Transport:

- **Requires that a protein carrier pick up certain molecules such as glucose and amino acids and transport them to the other side.** } **1 mark**

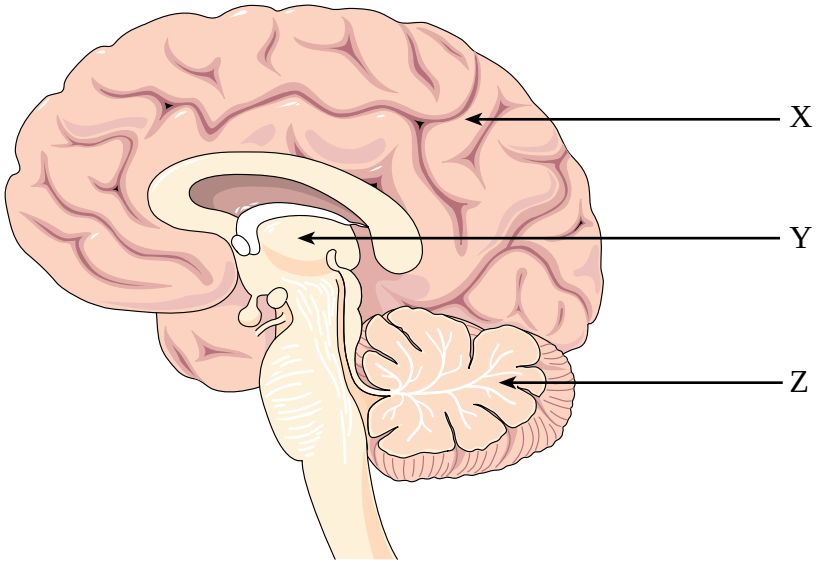
iii) Pinocytosis:

- **Molecules on the surface of the cell membrane enter the cell as the membrane invaginates around the molecules and pinches off a food vacuole.** } **1 mark**

4. In paragraph form, describe the chemical breakdown of starch to a monosaccharide in the human body. **(7 marks)**

- **Salivary glands produce salivary amylase.**
- **Salivary amylase hydrolyzes starch to maltose.**
- **Salivary amylase is released into the mouth.**
- **Neutral pH is necessary to the action of salivary amylase.**
- **When maltose hits the duodenum, pancreatic amylase is produced (in pancreatic juice) by the pancreas.**
- **Pancreatic amylase hydrolyzes starch to maltose.**
- **Pancreatic amylase and maltase are active in the small intestine.**
- **The pH in the small intestine is basic (alkaline).**
- **Intestinal glands produce maltase.**
- **Maltase hydrolyzes maltose to glucose.**
- **Each time molecules are broken down, hydrolysis occurs (a water molecule is added).**

5. Identify each part of the brain indicated in the diagram below and give **one** function of each.
(6 marks: 1 mark each for name and 1 mark each for function)



Part X: **Cerebrum. (1 mark)**

Function: **The cerebrum is responsible for consciousness. (1 mark)**

Part Y: **Thalamus. (1 mark)**

Function: **The thalamus serves as a relay station for sensory impulses, channelling them to the appropriate regions of the cortex for interpretation. (1 mark)**

Part Z: **Cerebellum. (1 mark)**

Function: **The cerebellum coordinates the muscles, thus ensuring smooth and graceful movement. (1 mark)**

6. State **four** ways in which the liver is important to the human body. **(4 marks)**

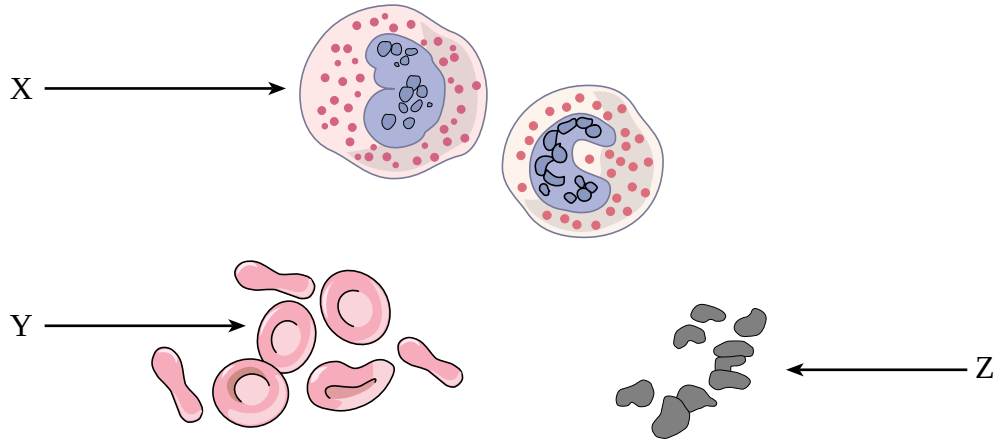
- **Makes blood proteins.**
- **Produces bile which emulsifies fat.**
- **Breaks down amino acids and produces urea.**
- **Destroys old red blood cells and breaks down hemoglobin.**

and/or

- **Stores glucose as glycogen and breaks down glycogen to glucose to maintain blood glucose concentration.**
- **Detoxifies the blood by removing and metabolizing poisons.**

any 4 for 1 mark each

7. Identify each blood component indicated in the diagram below and give **one** function of each.
(6 marks: 1 mark each for name and 1 mark each for function)



Component X: **White blood cells. (1 mark)**

Function: **Fight infection. (1 mark)**

Component Y: **Red blood cells. (1 mark)**

Function: **Carry oxygen. (1 mark)**

Component Z: **Platelets. (1 mark)**

Function: **Clot blood. (1 mark)**

8. State **one** function of each of the following. **(8 marks: 1 mark each)**

i) Glomerulus:

- **Filters the fluid entering Bowman's capsule, keeping large molecules in the blood.** } **1 mark**

ii) Aldosterone:

- **Regulates sodium concentration of the blood.** **(1 mark)**

iii) Ureter:

- **Carries the urine from the kidneys to the urinary bladder.** **(1 mark)**

iv) Distal convoluted tubule:

- **Tubular excretion (augmentation).**
  or
- **Control of blood pH.**

} **either one for 1 mark**

v) Urinary bladder:

- **Stores the urine until it is released from the body.** **(1 mark)**

vi) Peritubular capillary network:

- **Carry out the reabsorption of water and nutrients from nephron.** **(1 mark)**

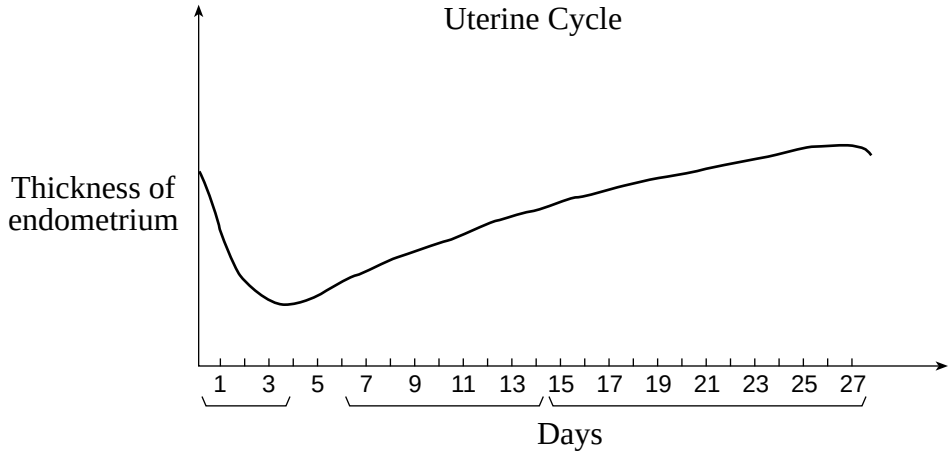
vii) Renal pelvis:

- **Collects urine and stores it temporarily.** **(1 mark)**

viii) Afferent arteriole:

- **Brings blood to the glomerulus.** **(1 mark)**

Use the following graph to answer question 9.



9. Relate the development of the follicle to the observed changes in the thickness of the endometrium at: **(6 marks: 2 marks each)**

Days 1-3: **The endometrium is sloughed off (1 mark) because of the low levels of estrogen and progesterone being secreted by an immature follicle. (1 mark)**

Days 7-14: **The endometrium is rebuilding and thickening (1 mark) due to the increase in estrogen being secreted by the developing follicle. (1 mark)**

Days 15-27: **The endometrium becomes thick, vascular and secretory (1 mark) due to the secretion of progesterone by the corpus luteum. (1 mark)**

END OF KEY