

UNIT 3 BIOLOGY 2005 TRIAL EXAMINATION SOLUTIONS

SECTION A: MULTIPLE CHOICE QUESTIONS

	Answer		Answer
Question 1	A	Question 14	B
Question 2	C	Question 15	C
Question 3	B	Question 16	C
Question 4	C	Question 17	A
Question 5	B	Question 18	D
Question 6	C	Question 19	A
Question 7	B	Question 20	B
Question 8	C	Question 21	C
Question 9	B	Question 22	A
Question 10	B	Question 23	C
Question 11	C	Question 24	C
Question 12	C	Question 25	B
Question 13	B		

SECTION B: SHORT ANSWER QUESTIONS

QUESTION 1

- a. (i) Inhalation of cyanide resulting from processing (1).
 (ii) Ingestion of poorly processed cassava plants (1).

- b. Attention to experimental design (1). For example:

Large number of plants in the sample, plants of similar size/age, similar growing mediums provided for all plants

Levels of linamarin measured in root and leaf tissue of plants following germination to a suitable age at suitable intervals (1).

For hypothesis to be true, would expect higher levels of linamarin in the leaves, followed by an increasing level of linamarin in the roots (1).

- c. $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$

All correct = 2 3-4 correct = 1 1-2 correct = 0

- d. To help protect the plant from being eaten by insects or large animals (1).

QUESTION 2

- a. Phototropism (1).
- b. Auxins (1). Auxin is actively produced in the growing region – tip – of the shoot. It causes cell elongation. In the presence of unilateral light, auxin accumulates on the dark side of the tip, causing these cells to elongate, resulting in the bending shown. With the tip removed, no auxin is produced and no bending observed (2).
- c. Ethylene (1).
- d. Ethylene is a hormone which stimulates respiration and the ripening of fruit (1). An over ripe apple will produce large amounts of this gas, accelerating the ripening of the other apples (1).

QUESTION 3

- a. Maternal enzymes protect the developing foetus (1), preventing toxic build-up of harmful metabolites or toxins (1).
- b. Phenylalanine resulting from normal tissues breakdown (1).
- c. Presence of abnormal levels of phenyl ketones in the urine (1).
Presence of abnormal levels of phenylalanine in the blood (1).
(This is known as the Guthrie test).

QUESTION 4

a.

Blood Group	Anti-A added	Anti-B added	Anti-A + B added
A	√	X	√
B	X	√	√
O	X	X	X
AB	√	√	√

1 x 3 marks – 1 mark each column (All or nothing).

- b. Blood Type O (1).
People of blood type O are referred to as a universal donor for blood donations, because they lack antigens A & B. on their blood cells (1). Thus, their blood cells will not be recognised as non self in recipients, and antibodies will not be produced against them (1).
- c. Rh disease results in anaemia, which is a lack of RBC, hence, a lack of oxygen (1). Oxygen is a requirement of the energy liberating reaction of respiration. Thus cells may not be supplied with the energy they require to sustain growth (1).
- d. Inject the mother with antibodies to Rh positive cells within 48 hours (1). This removes the Rh positive cells which have escaped during birth, preventing any antibody formation (1).

- e. B Memory Cells (1).
B memory cells exist from the first pregnancy of the Rh negative women with an Rh positive baby (1). These memory cells result in the production of B cells which result in the production of large quantities of antibodies to the Rh antigen (1). No “learning” or “recognition” period is required in this subsequent pregnancy to the Rh antigen.

QUESTION 5

- a. Freshwater protists do not have a cell wall (1) to prevent the cell from rupturing following the influx of water along the concentration gradient into the cell (1).
- b. The concentration of free water molecules is the same in both the vesicle and cytoplasm (1).
- c. Mitochondria. Mitochondria provide energy in the form of ATP (1) to allow for the process of active transport of the ions against the concentration gradient into the cytosol (1).
- d. The activity of the contractile vacuole decreases as the concentration of the medium increases (1).

As the concentration of the medium increases the osmotic gradient into the *A.lacerata* decreases (1), resulting in less water entering *A.lacerata* and thus less water needing to be expelled by the contractile vacuole (1).

QUESTION 6

- a. Homeostasis (1).
- b. To cool the body (1).
Sweat glands place moisture on the skin surface (1). The energy required for this moisture to evaporate comes from the skin’s surface thus cooling the body (1).
- c. Would diminish the cooling effect offered to the body (1).
- d. Osmoreceptors in the hypothalamus (1) - both required for 1 mark.
- e. Osmoreceptors / osmoregulators in hypothalamus → Increased release of ADH from pituitary gland → ADH causes cells of distal tubule and collecting tubule to change cell membrane permeability to water → More water is reabsorbed

4 correct points = 2 marks
3 correct points = 1 mark
1-2 correct = 0 marks

- f. Negative, as it serves to reverse the initial stimulus – lack of water (1).