

JUNIOR LYCEUM ANNUAL EXAMINATIONS 2003
Educational Assessment Unit – Education Division

Form 4

BIOLOGY

TIME: 1hr 30mins

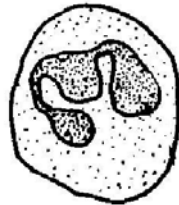
Name: _____

Class: _____

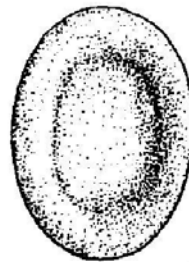
SECTION A. This section carries 55 marks.

ANSWER ALL QUESTIONS IN THE SPACE PROVIDED.

1. The diagram below shows two cells taken from a human blood sample.



cell B



cell A

a) Name :

Cell A _____ Cell B _____ (2)

b) Give one difference, shown on the diagram, between these two cells.

_____ (1)

c) State one function, and one adaptation related to this function, of :

(i) Cell A

(ii) Cell B

Function of Cell A _____

Adaptation _____ (2)

Function of Cell B _____

Adaptation _____ (2)

Total 7 marks

2. The table below shows four different snacks and four statements relevant to different food groups.

MEAL	STATEMENT
A) scrambled eggs on toast	a) stops scurvy
B) glass of milk	b) helps towards healthy bones and teeth
C) spaghetti	c) body builders and iron providers
D) glass of orange juice	d) good energy food

a) Pair up each of the meals above with the most appropriate statement.

A _____ B _____ C _____ D _____ (4)

b) People who do a lot of physical exercise often believe that they need a large amount of protein.

(i) Explain why this belief may be wrong.

_____ (2)

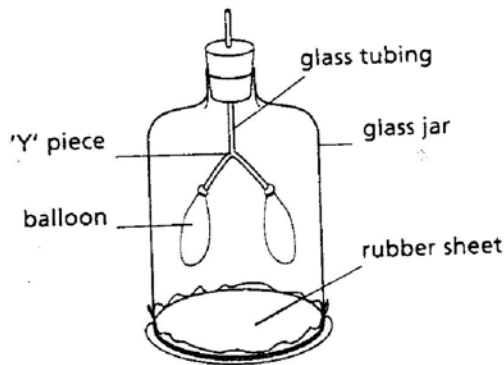
(ii) Suggest a more appropriate nutrient and give a good source of the nutrient suggested.

Nutrient _____

Source _____ (2)

Total 8 marks

3. The diagram below shows a model of the mechanism of breathing in humans.



a) Each of the labelled parts represents a part of the human body. Choose any **three** of the labelled parts, and for each state the part of the human body which it represents.

1 _____

2 _____

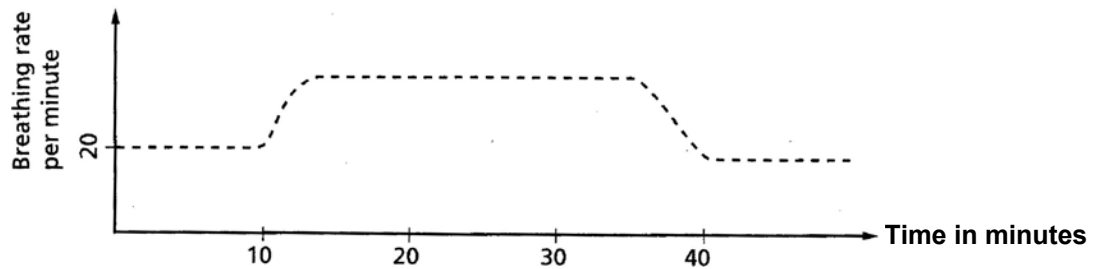
3 _____ (3)

b) List **three** differences between inhaled and exhaled air.

Inhaled Air	Exhaled Air
1	
2	
3	

(3)

c) The graph below shows the breathing rate of a student before during and after exercise.



Mark **on the graph** the point at which the student starts to exercise. (1)

d) What is the normal breathing rate for this student?

(1)

e) During exercise the student's muscles begin to ache.

(i) Name the chemical, produced by the body during strenuous exercise, which causes muscles to ache.

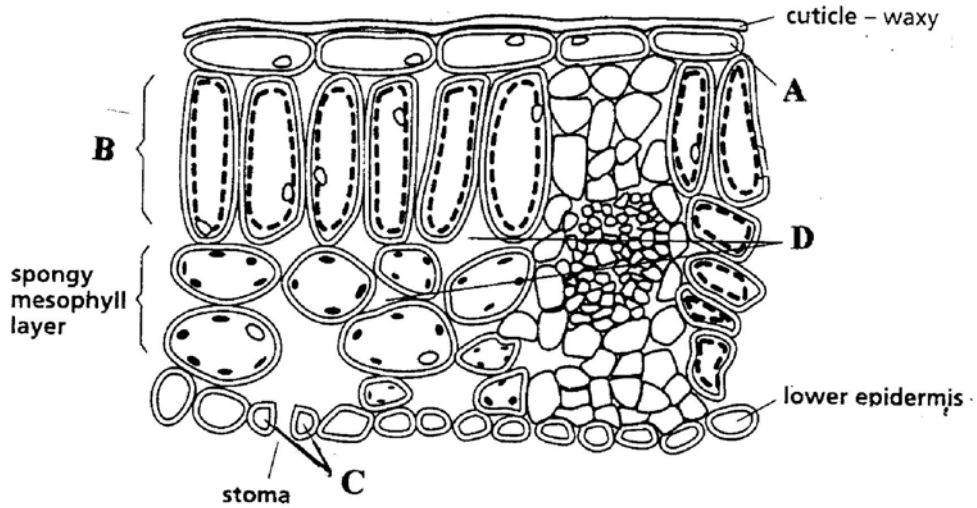
(1)

(ii) What causes the body to produce the chemical named in 'e' (i) during strenuous exercise?

(1)

Total 10 marks

4. The diagram below shows the internal structure of a leaf.



a) Name the parts labeled:

A _____ B _____
 C _____ D _____ (4)

b) Part A and part B are both adapted to facilitate photosynthesis. Explain how.

 _____ (4)

c) Give one other adaptation of leaves for photosynthesis.

_____ (1)

d) The cuticle of the leaf in the diagram is waxy. State one way in which a **waxy** cuticle may be helpful to a plant.

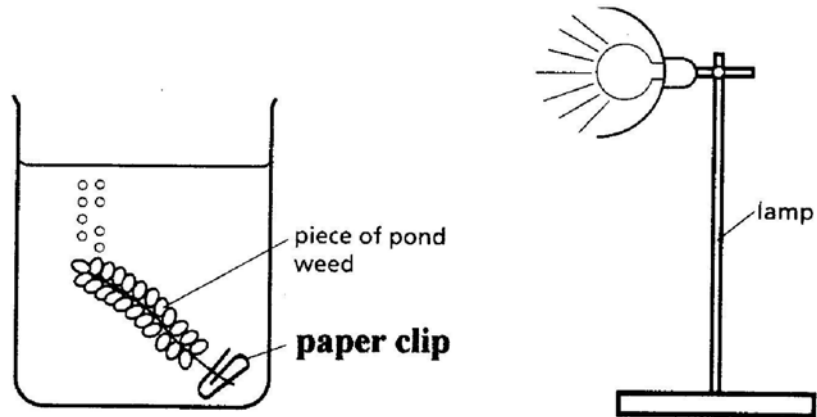
_____ (1)

e) State **one** importance of stomata to plants.

_____ (1)

Total 11 marks

5. The following diagram shows the apparatus used in an experiment to show the affect of light intensity on the rate of photosynthesis.



a) List **four** factors which must be kept constant in this experiment while intensity of light is being changed.

1 _____

2 _____

3 _____

4 _____ (4)

b) Bubbles of a gas are being produced during the experiment. Name the gas.

_____ (1)

c) How can you test that your answer to 'b' is correct?

_____ (2)

d) How can the bubbles of gas, being produced, help to measure and compare the rate of photosynthesis?

_____ (1)

e) Why was the paper clip used?

_____ (1)

f) Name **one** other factor besides light that may limit the rate of photosynthesis.

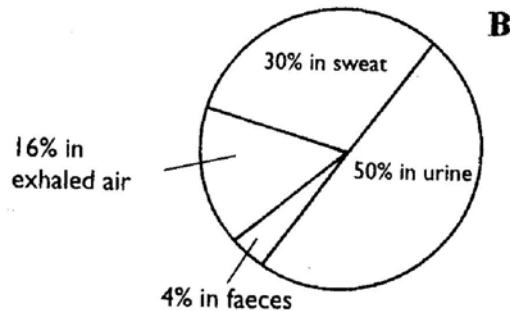
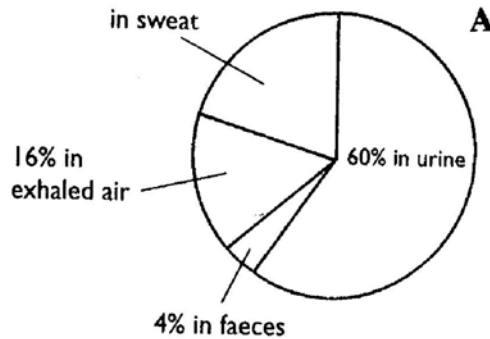
_____ (1)

g) Give a word equation for photosynthesis.

_____ (3)

Total 13 marks

6. Pie chart **A** below represents a person's daily water loss, and chart **B** represents the same person's daily water loss at a different time of year.



a) What percentage of the person's water was lost as sweat in chart A?

_____ (2)

b) If the total volume of water lost in chart A was 2500 cubic cm, what volume of water was lost in exhaled air?

 _____ (2)

(In 'a' and 'b' working must be shown.)

c) Using your knowledge and the information given in the charts, name the **environmental factor** that most probably was responsible for the difference between the volume of water lost as urine, and that lost as sweat in the respective charts. Give **one** reason to support your answer.

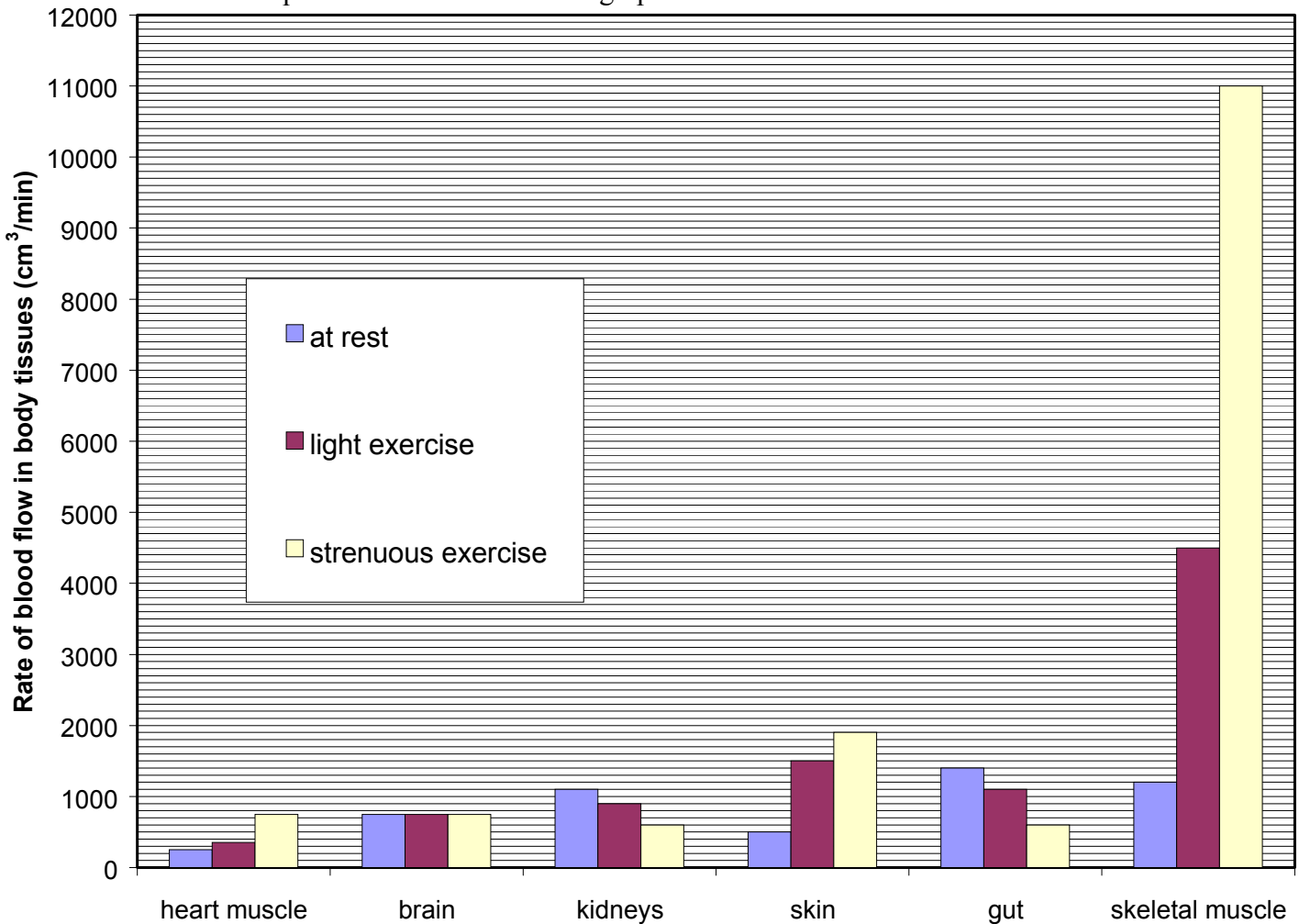
 _____ (2)

Total 6 marks

SECTION B : This section carries 45 marks.
(Answer on the separate paper provided)

Answer Question ONE and any other TWO questions.

1. The following bar graph shows the rate of blood flow to various parts of a student's body under differing conditions of exercise. Using this information and your knowledge, answer the questions which follow the graph.



- a) What is the rate of blood flow per minute to the following body parts?
- (i) heart muscles when at rest
 - (ii) brain during light exercise
 - (iii) gut during strenuous exercise. (3)
- b) To which part of the body does blood flow at the lowest rate during light exercise?(1)
- c) What effect does increasingly strenuous exercise have on the rate of blood flow to the following body parts?
- (i) gut
 - (ii) brain
 - (iii) skin (3)

- d) Name one other part of the body that shows the same response to increase in exercise as : (i) the gut (ii) the skin (2)
- e) The rate of blood flow to the skin increases as strenuous exercise increases. Explain why this is important to the student. (3)
- f) Calculate the **total** volume of blood per minute being pumped by the left ventricle to **all** of the parts of the body given in the graph during a period of **rest**. (2)
- g) If the student's pulse rate at **rest** is 65 beats per minute, what volume of blood is being pumped out of the left ventricle during **each** heart beat when at rest? (1)

2 a) Explain the difference between 'Digestion' and 'Egestion' (3)

- b) Protein is an important constituent of a balanced diet.
- What are proteins?
 - Name one importance of proteins to organisms.
 - Where does digestion of proteins start in humans?
 - Name an enzyme that digests proteins. (2, 1, 1, 1)

c) A student claims that nuts are rich in oil and protein. Describe **two separate** simple tests by which the student can show that nuts are rich in these two nutrients. (3, 4)

3 a) The circulatory system is called the 'transport system'. Give **three** reasons why this system is referred to as the **transport** system. (3)

b) Explain briefly the changes that occur in blood as it passes through the kidneys. (3)

- c) Blood flows through different blood vessels, that is arteries, veins and capillaries. State:
- one** difference **in structure** between arteries and veins.
 - one** important characteristic of capillaries which facilitates diffusion of substances in and out of them. (2)

- d) A transport system is also to be found in most plants.
- Name the vessels through which water is transported in plants.
 - Draw a diagram to show the position of these vessel in a stem.
 - Describe a simple experiment to show that water absorbed by roots is transported through the stem. (1, 2, 4)

- 4 a) Define the word 'breathing' (2)
- b) Name **two** structures which help the breathing movements in the human body. (2)
- c) 'Breathing through the nose is healthier than breathing through the mouth'. Give your comments about this statement. (3)
- d) Strenuous exercise effects both the breathing rate as well as the heart rate. Describe an experiment to show that strenuous exercise effects the heart rate. (5)
- e) Mammals breathe through lungs and fish breathe through gills. List **three** characteristics, common to these two breathing organs, which make them both efficient respiratory surfaces. (3)
- 5 a) Draw a clear well labelled diagram to show the structure of the human urinary system. (4)
- b) In mammals the kidneys control the amount of water in the body. Describe how **fresh water** protists control the amount of water in their body. (3)
- d) A student noticed that when s/he feels cold s/he looks pale and shivers, while when s/he feels hot s/he looks flushed and sweats. Explain how each of these body changes helps the student to control his /her body temperature. (8)