JUNIOR LYCEUM ANNUAL EXAMINATIONS 2003

Educational Assessment Unit - Education Division

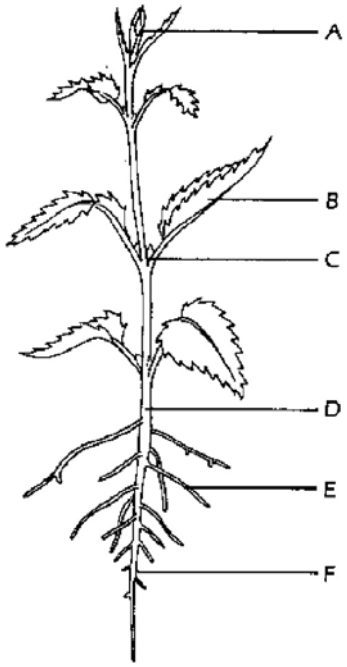
FORM 5 **BIOLOGY** **TIME 1h 45min**

Name :_____**Class**_____

SECTION A : This section carries 55 marks
ANSWER ALL QUESTIONS IN THE SPACES PROVIDED.

Do not write in this margin

1. a)The diagram below shows the structure of a plant.



i) Label the structures marked:

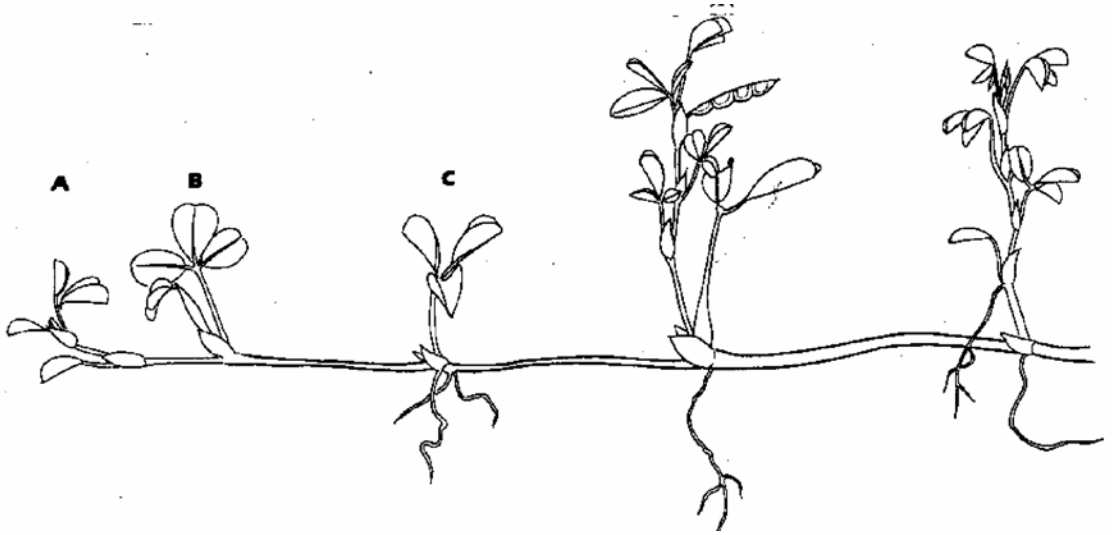
D_____ E_____ (2)

ii) Name **one** function of the structure labelled **D.**

_____ (1)

iii) Indicate the plant structure that must be removed if the plant is not desired to grow taller. _____ (1)

b) The diagram below shows a particular type of plant reproduction.



(i) Is this type of reproduction **sexual** or **asexual** ?

_____. (1)

(ii) What name is given to the population of offsprings produced as shown in the diagram above ?

_____. (1)

(iii) Give **one** commercial advantage **or** disadvantage of this type of reproduction.

_____ (1)

(iv) Name **two** structures that the new plants produced, A, B, C, have to develop before these become independent plants, and explain why this is important.

Structure 1 _____

Importance of Structure 1 _____

Structure 2 _____

Importance of Structure 2 _____ (4)

Total 11 marks

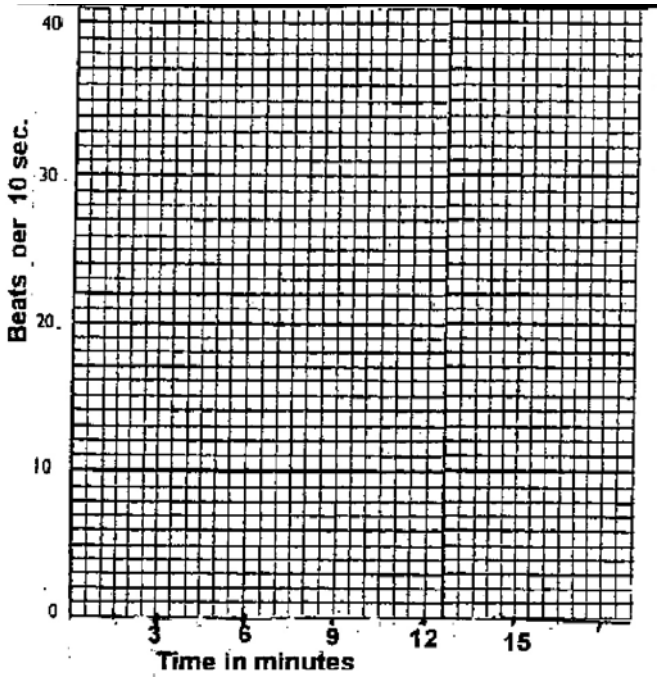
2. The pulse rate of an individual was taken at rest, just before a race, and at 3 minutes

intervals for 15 minutes after the race. The results are shown below.

Pulse rate at rest = 12 beats in 10 sec.
Pulse rate just before the race = 15 beats in 10 sec.

Time from end of race in minutes.	0	3	6	9	12	15
Pulse rate in beats per 10 seconds.	36	28	21	16	12	12

a) In the space provided, plot a graph showing the results shown above.



(3)

b) Calculate the individual's normal pulse rate in beats per minute. (Show your working)

_____

_____ (2)

c) How much greater is the individual's pulse rate, in beats per minute, at the **end** of the race compared with the pulse rate **just before** the race.

_____ (2)

(Show your working)

d) How long did it take for the individual's pulse rate to return to normal resting rate?

_____ (1)

Total 8 marks.

3. a) In the table below point out the differences between the nervous and endocrine systems. The first one is given as an example.

	Nervous system	Endocrine system
Area affected	Very localised	Rather general
Speed of conduction		
Route of conduction		
Duration of response		

(6)

b) Name the **two** components of the Nervous system.

(i) _____ (ii) _____ (2)

Total 8 marks.

4. Put a circle round the correct answer.
   a) The fusion of the male and female gametes is referred to as:
      i) copulation ii) implantation iii) fertilisation iv) gestation v) ovulation

   b) In humans fusion of gametes normally takes place in the ;
      i) ovary ii) oviduct iii) uterus iv) uterus lining v) vagina.

   c) A reflex action is a :
      i) Region of the brain responsible for memory.
      ii) Tiny space between two neurones.
      iii) Rapid automatic involuntary response to a stimulus.
      iv) Nerve cell in a reflex arc.
      v) Sense organ that converts a stimulus into a nerve impulse.

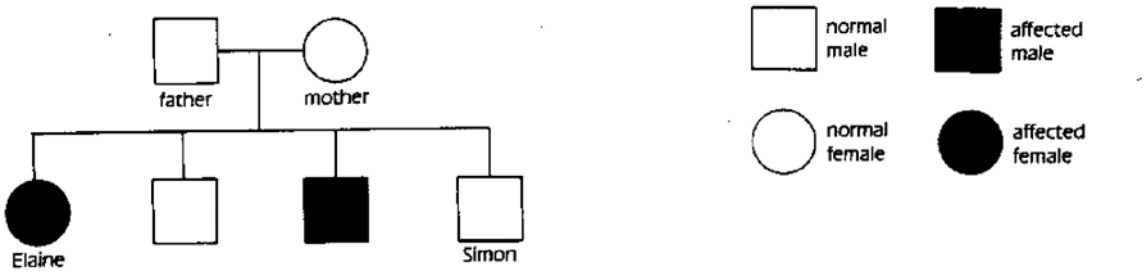
   d) 'Y' chromosomes are :
      i) Type of sex chromosomes present in males and females.
      ii) Type of sex chromosomes present in males only.

iii) Type of sex chromosomes present in females only.
iv) Type of sex chromosomes that always carry diseases.
v) Type of sex chromosomes that always carry recessive genes.

e) A chloroplast is a :
i) Green substance found in green plants.
ii) Structure that controls all cell activities.
iii) Vacuole in a plant cell.
iv) Basic unit of life.
v) Plant structure containing chlorophyll.

Total 5 marks

5. The family tree below shows the pattern of inheritance of a genetic disorder.



a) Is the disease controlled by a dominant or a recessive allele (**N or n)** ?

_____ (1)

b) Give a reason to support your answer to 'a'.

_____ (1)

c) It is unlikely that the disease being referred to in the above diagram is sex linked. Give a reason.

_____ (1)

d) Name a sex linked disease.

_____ (1)

e) What must be the genotype of:

i) Elaine _____ ii) her mother _____ iii) her father _____(3)

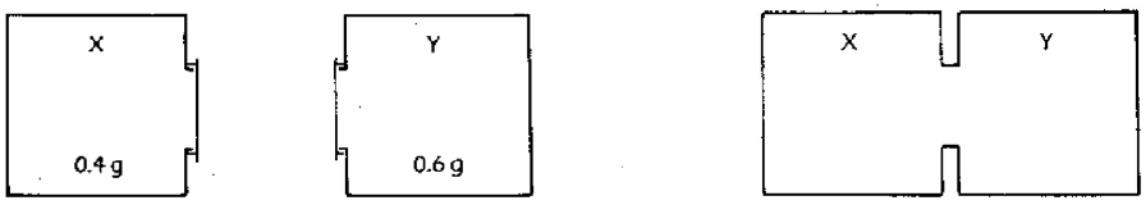
f) What might Simon's genotype be? Give a reason.

_____

_____ (2)

Total 9 marks

6. The diagram below shows containers **'X'** and **'Y'.**



Containers 'X' and 'Y' each hold one litre of air. 'X' also contains 0.4g of a gas and 'Y' contains 0.6g of the same gas. The two containers are connected together as shown in the diagram.

a) Which way will the gas diffuse?

_____ (1)

b) After a long period of time, what will be the concentration of the gas, (in grams per litre), in each container? (Show your working).

_____

_____ (2)

c) Most living cells respire aerobically. Name :
   (i) the **two** gases that will be diffusing in and out of cells during **aerobic respiration.**
   (ii) the **direction** these gases will be diffusing (**in** or **out** of the cells).

Name of gases : 1 _____ 2 _____

Direction 1. _____ 2_____ (4)

d)Which of the following statements is an acceptable definition of :

1. diffusion **2. osmosis.**

(i) The movement of water particles from a concentrated to a dilute solution, across a partially permeable membrane.

(ii) The movement of particles of a substance from a high concentration to a low concentration of that substance.

(iii) The movement of water particles from a dilute solution to a more concentrated solution, across a partially permeable membrane.

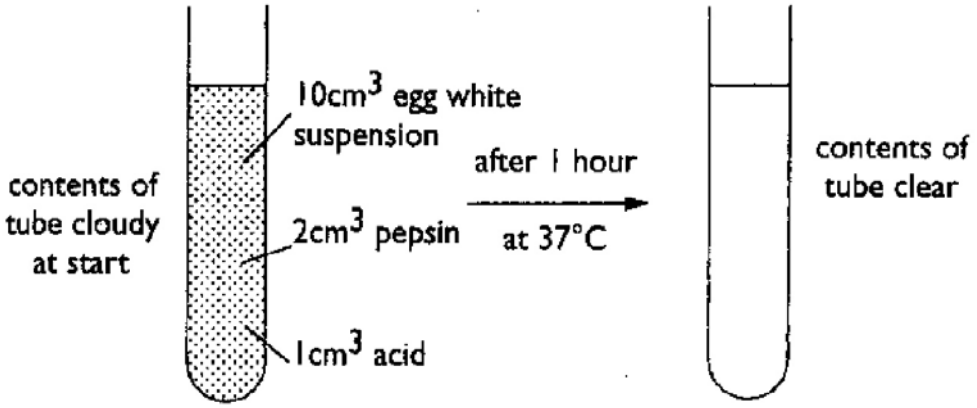
(iv) The movement of particles of a substance from a low concentration to high concentration of that substance.

Diffusion is _____

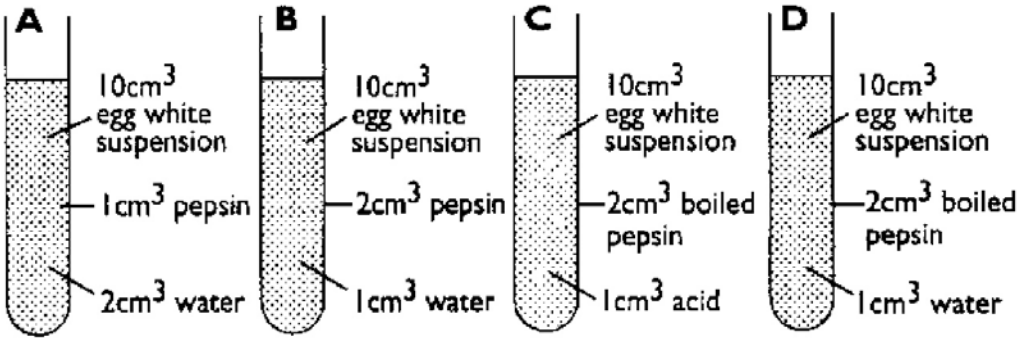
Osmosis is _____ (2)

Total 9 marks.

7.



The diagram given above shows an experiment carried out by a group of pupils to investigate the effect of acid on the action of the enzyme pepsin. Other groups were asked to design a control experiment. Some of their suggestions are shown in the following diagram.



d) V

_____ (1)

d) Explain in turn, why each of the others is invalid.

_____

_____

_____ (3)

d) In the original experiment the contents of the test tube turned from cloudy to clear. What does this indicate?

_____ (1)

Total 5 marks

SECTION B : This section carries 45 marks.

(Answer on the separate paper provided).

Answer Question ONE and any other TWO questions.

1. Read the following paragraph and answer the questions below.

Although often confused with the coconut palm, the cocoa (cacao) tree is an entirely different plant. When mature it is an evergreen tree with large leaves and pinkish-yellow flowers that develop into pods. Each pod contains about 40 cocoa beans, which are full of useful foodstuffs.
On harvesting, the beans must be fermented, dried, roasted and crushed. Then their contents can be made into highly nourishing cocoa powder (drinking chocolate). Milk chocolate is a mixture of cocoa powder, sugar and milk. The main producers of cocoa are the West Indies and Central and South America.

a) The tree mentioned in the passage is **an evergreen tree with large leaves.** Name **ONE advantage** and **ONE disadvantage** of such a tree having **large leaves.** (2)

b) Give the biological meaning of (i) **mature**
(ii) **evergreen** (2; 1)

c) **Pods** are classified as '**fruit'.**
(i) What is a **fruit?**
(ii) What is the main function of fruit?
(iii) Name a plant you have studied that produces pods. (1, 1, 1)

d) Suggest **two** nutrients that are normally found in seeds such as cocoa beans and state the importance of **one** of these nutrients to the human body. (2, 1)

e) When making chocolate, sugar and milk are added to cocoa powder. Why is milk so important in our diet? (2)

f) The average annual yield of a cocoa tree is found to be **25 pods.** If the total number of beans from **25** healthy pods weigh 1000g, what is the average weight of **one** fresh cocoa bean? (Working must be shown) (2)

Total 15 marks.

2. a) By the help of examples of organisms you have studied, distinguish between :
   (i) sexual and asexual reproduction.
   (ii) Internal and external fertilisation
   (only **one** example of each is expected) (2; 2)

b) In humans development of the embryo takes place in the uterus, inside the female's body. Give **two** advantages and **one** disadvantage of internal development, to the embryo. (3)

c) Explain the role of hormones in the control of the human menstrual cycle. (8)

Total 15 marks

3. a) List the **3** important conditions seeds need in order to germinate. (3)

b) Describe an experiment to demonstrate that your answer to '**a**' is correct. (6)

c) You are asked to grow some seedlings in total darkness, and some others of the same type in the light, for the same period of time. Predict any **3** differences you would expect to find between the seedlings growing in the light and those growing in the dark. (3)

d) A young plant in a pot is turned on its side. After 24 hours the stem develops a curve which makes the tip of the shoot vertical once more. Briefly explain the process that led to the development of the curve in the stem. (3)

Total 15 marks

4.a) Give an equation, in words **or** symbols, which summarises the process of photosynthesis. (3)

b) Describe an experiment to demonstrate that unless light is present, green plants do not build up starch. (6)

c) A leaf was detached from a **tree** and tested for starch. A positive test resulted. Explain why this is **not** sufficient evidence to confirm that photosynthesis had taken place in the leaf. (3)

d) To date we all believe that all organisms depend on **green** plants for their energy. Briefly explain why. (3)

Total 15 marks

5. a) One of your friends found some green string-like material in a pond. Briefly explain to him how he can find out if the material found is : i) **alive** ii) **a plant or an animal**

(4; 2)

b) Some organisms are **saprophytes** and others are **parasites.**

(i) Explain the **difference** between **saprophytes** and **parasites**

(2)

(ii) **Name** a fungus you have studied and indicate **two environmental conditions** and **one possible host** which favour the growth of this fungus.

(1, 2, 1)

(iii) **Describe** how the fungus **named in (ii),** obtains food from its host. (3)

Total 15 marks.