# JUNIOR LYCEUM ANNUAL EXAMINATIONS 2001

**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.**

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**1.** The diagram below shows a human ovum (egg cell) being fertilised by a sperm containing a Y sex chromosome.

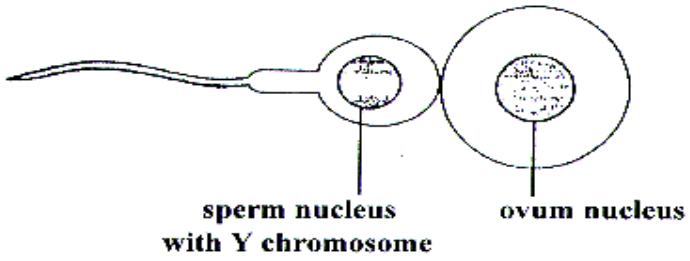



**Diagram Not To Scale**

a. What will be the sex (male or female) of the baby produced as a result of this fertilisation?

_____(1)

b. Complete the table below by writing in numbers or words from the list :
***Note that each can be used once, more than once or not at all.***
**23 ; 46 ; 64 ; haploid ; diploid ;**

| Cell | Number of chromosomes in cell nucleus | Type of nucleus |
|---|---|---|
| Sperm | 23 | |
| Ovum (egg cell) | | haploid |
| Fertilised egg (zygote) | | |

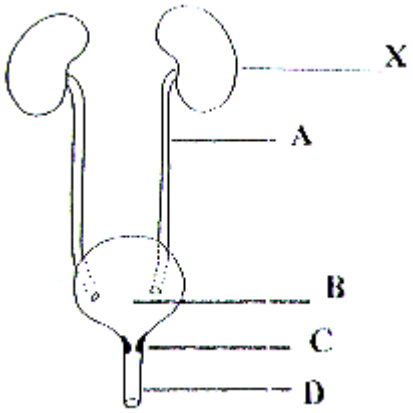
(4)

c. Complete the following statement:
Once fertilisation has occurred, normally in one of the _____, the embryo grows, moves into the uterus and _____ itself into the uterine wall. The exchange of oxygen, food and wastes between mother and foetus depends on _____ across the thin wall of the _____. The time taken for the foetus to develop from conception into a baby is called the _____. It usually lasts nine months in humans. (5)

**(total 10 marks)**

**2.** The diagram below shows the human urinary system as drawn by a biology student.

Do not write in this margin




a. Name the parts labelled A, B, C and D.

A_____

B_____

C_____

D_____ (1 mark each)

b. Name the liquid which is found in structure B

_____ (1)

c. Name two substances, other than water, which may be found in the liquid mentioned in '***b'***. above, under normal conditions.

(i) _____ (ii) _____ (2)

d. (i) Name the microscopic structures found in organ 'X': _____(1)

(ii) Draw a clear labelled diagram of one of the microscopic structures named in **d(i)** (6)

**(total 14 marks)**

**3** The table below shows the total food value of a school lunch eaten by Janet,

Do not

a 16 year - old girl .

write in this margin

| Food Eaten | | Protein in g. | Carbohydrates in g. | Fat in g. | Iron in mg. | Vitamin C in mg. |
|---|---|---|---|---|---|---|
| Sausages | | 9 | 5 | 24 | 1 | 0 |
| Chips | | 8 | 71 | 20 | 2 | 20 |
| Baked beans | | 10 | 20 | 1 | 3 | 4 |
| Apple pie | | 5 | 60 | 25 | 1 | 1 |
| Ice Cream | | 3 | 20 | 12 | 0 | 0 |
| Fizzy drinks | | 0 | 30 | 0 | 0 | 0 |

a. In this school lunch, which food gave Janet most protein: _____(1)
b. Why does Janet needs proteins? _____
_____ (2)
c. The girl needs 15 mg. of iron and 25 mg. of Vitamin C daily to keep healthy.

(i) How much of her **daily iron needs** did this lunch give Janet? _____mg. (1)

(ii) Name one *importance of iron* in diet: _____(1)

(iii) Name the two chemicals needed to test the sausages for proteins :

_____; _____ (2)

**(total 7 marks)**

**4.** State 3 functional or structural differences between arteries and veins:

| Arteries | Veins |
|---|---|
| 1. | 1. |
| 2. | 2. |
| 3. | 3. |

**(total 3 marks)**

**5.** Complete the following table :

| Digestive Gland producing enzyme | Enzyme | Acting on | End Product of Digestion |
|---|---|---|---|
| **SALIVARY** | | | |
| | **PEPSIN** | | |
| **PANCREAS** | | | |

**(total 9 marks)**

**6.** This exercise is about **classification.**

Do not write

Match a number in Column A with a letter in Column B.

**The first one is done for you.** **in this margin**

| A | B |
|---|---|
| **1. reptiles** | **a.** does not have a backbone but has five arms. |
| **2.** echinoderm | **b.** jointed legs. Bodies made up of segments. |
| **3.** conifers | **c.** has a cell wall made of chitin and feeds on dead plants and animals. |
| **4.** arthropods | **d. has scales and lays soft-shelled eggs on land.** |
| **5.** coelenterates | **e.** seeds produced in cones; needle shaped leaves. |
| **6.** fungi | **f.** body wall made up of two layers of cells; tentacles with stinging cells surrounding the mouth. |

**ANSWERS**

| | | | | | |
|---|---|---|---|---|---|
| **1. d** | **2.** | **3.** | **4.** | **5.** | **6.** |

**(total 5 marks)**

**7.** A Biology student used a potometer to demonstrate the rate of water movement through a leafy shoot.
The following results were obtained by measuring under different conditions, the time taken for the water in the capillary tube to move a distance of 100mm.

| **Conditions** | **Time (in minutes) taken for the water to move 100mm** |
|---|---|
| Cool, moving air, in daylight | 2 |
| Cool, still air, in daylight | 6 |
| Warm, moving air, in daylight | 1 |
| Warm, still air, in daylight | 4 |
| Warm, still air, at night | 60 |

a. Name the process by which the plant loses the water through its leaves.
_____(1)

b. **From the table,** state three conditions which affect the rate of movement of water through the plant.
(i). _____; (ii). _____; (iii). _____ (3)

c. State the rate of water movement (***in mm per minute)*** in warm, still air, in daylight. ***Show your working.***

_____
_____(2)

d. Suggest what would happen to the rate of water movement if the lower surface of the leaves were covered with petroleum jelly or grease.
_____(1)

**(total 7 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:

In order to survive in the world in which we live, we must be able to react to changes that occur in it. Behaviour is a mixture of **reflexes,** some that you are born with and others learned throughout life. Your response to a sharp, unexpected pin prick on the hand is an example of a simple **reflex action**.

The **nervous system and the endocrine system** control the responses we make to changes in the internal and external environment.

Reflexes are vital to our survival. Shivering when cold, increasing the rate of breathing when we are exercising and need oxygen, the contractions of the bladder and rectum when they are full to expel urine and faeces are inborn reflexes and vitally important to our survival.

a. Explain the difference between a reflex action and a reflex arc.(2)
b. Describe, with the help of a well-labelled diagram, the path taken by the impulse initiated by the unexpected pin prick on the hand. (7)
c. State **three** structural or functional differences between the nervous and the endocrine systems. (3)
d. The **brain** is a major part of the nervous system in humans. State **one** function of:
   (i) cerebrum (1)
   (ii) cerebellum (1)
   (iii) medulla oblongata (1)

**(total 15 mark)**

**2.** a. List the components of a fertile soil. (3)
b. State two differences between sandy and clay soil. (2)
c. '***Earthworms have a beneficial effect on soil'.*** Explain this statement. (3)
d. 250g. of fresh fertile soil contains 5g of humus. Work out the percentage humus content of this soil. **Show your working**. (2)

e. Describe an experiment to find out the approximate percentage **humus** content of a particular soil sample. (5) **(total 15marks)**

**3** a. Write a balanced equation, ( in words or symbols), summarising the process of ***'aerobic respiration*** (3)

b. State 3 differences between aerobic and anaerobic respiration. (3)

c. Describe, with the help of a well-labelled diagram, the process of gaseous exchange at the alveoli. (4)

d. Describe an experiment you would perform to show that **carbon dioxide** is produced during **anaerobic** respiration. (5) **(total 15marks)**

**4.** a. Write a balanced equation, (in words or symbols) summarising the process of ***'photosynthesis'.*** (3)

b. List two (2) adaptations of green leaves that help them perform the process of photosynthesis efficiently.(2)

c. Draw, a well-labelled diagram, to show the internal cellular structure of the leaf. (5)

d. Describe an experiment to show that **chlorophyll** is necessary for photosynthesis to occur. (5) **(total 15marks)**

**5.** a. Draw and label a large diagram to show the structure of a **named insect pollinated flower** you have studied. (5)

b. State the functions of 2 parts of the flower that you have labelled. (2)

c. Suggest two (2) ways by which an insect-pollinated flower might differ from a wind-pollinated flower. (2)

d. The flower colour of a certain species of plant is controlled by a single pair of alleles. When a red-flowered plant was pollinated with pollen from a white-flowered plant, the resulting offspring all had pink flowers.

Use the symbol **R** for allele controlling **red** colour and **W** for the allele controlling **white** colour.

(i) Give the genotype of the white-flowered parent plant.(1)

(ii) Give the genotype of the pink-flowered plant. (1)

(iii) Give the genotypes of the progeny/offspring produced by crossing the red-flowered parent plant with one of the pink-flowered plants and the ratio in which they appear. (2)

(iv) Give the genotypes of the progeny/offspring produced by self-pollination of two of the pink-flowered plants and the ratio in which they appear. (2)

**(total 15 marks)**