

**WARNING: You must return this section with your answer book otherwise marks will be lost.**

Write Your  
Examination  
Number here

**AN ROINN OIDEACHAIS**  
**LEAVING CERTIFICATE EXAMINATION, 1995**  
**BIOLOGY — ORDINARY LEVEL**

WEDNESDAY, 14 JUNE — MORNING 9.30 to 12.30

21937

Answer six questions from Part I and four questions from Part II.  
You should not spend more than 45 minutes on Part I, leaving about 135 minutes for Part II.

**PART I (120 marks)**

Answer six questions. Each question carries 20 marks.

Write your answers in the spaces provided.

Keep your answers short.

Write your examination number at top.

**Be sure to return this part of the examination paper; enclose it in the answer book you use for answering Part II.**

**1. Answer four of the following:**

- (a) The class of chordates which have mammary glands and are warm blooded are known as .....
- (b) Which of the following is *not* caused by a virus?
  - (i) rabies
  - (ii) poliomyelitis
  - (iii) tetanus
  - (iv) common cold
  - (v) influenza
- (c) Name the bone which connects the shoulder to the elbow .....
- (d) Plants which feed on dead organic matter are known as .....
- (e) The colon functions in the absorption of .....

**2. The diagram shows a typical plant cell as seen through an electron microscope.**

Name the parts labelled A, B, C, D, E.

A. ....

B. ....

C. ....

D. ....

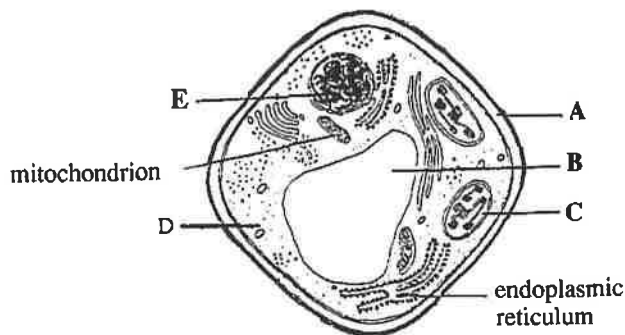
E. ....

Name two structures shown in the diagram which are *not* found in a typical animal cell.

(i) .....

(ii) .....

State any one function of the mitochondrion.



.....

3. (a) To which plant group does *Spirogyra* belong? .....  
Name a habitat in which *Spirogyra* may be found .....  
.....  
Is the normal filament cell in *Spirogyra* haploid or diploid?.....  
How does *Spirogyra* reproduce asexually? .....

(b) The moss plant and the prothallus of the fern are both said to be monoecious. What does the term monoecious mean?.....  
.....

In the case of either the moss or the fern explain why water is necessary in order to complete the life cycle.  
.....  
.....

During dry weather the ripe capsule of the moss and the sorus of the fern release reproductive structures. In the case of either of these plants name these structures. ....

4. State two characteristics of insects which place them in the phylum Arthropoda.

- (i) .....
- (ii) .....

State why it is incorrect to refer to spiders as insects.  
.....  
.....

Insects can be both helpful and harmful to man. Give one example to support each case.

Some insects are helpful because .....

Some insects are harmful because .....

State one difference between a centipede and a millipede .....

5. Study the diagram and answer the following questions:

What process is being studied in the experiment?

.....

What essential property of the Visking tubing enables the experiment to proceed?

.....

.....

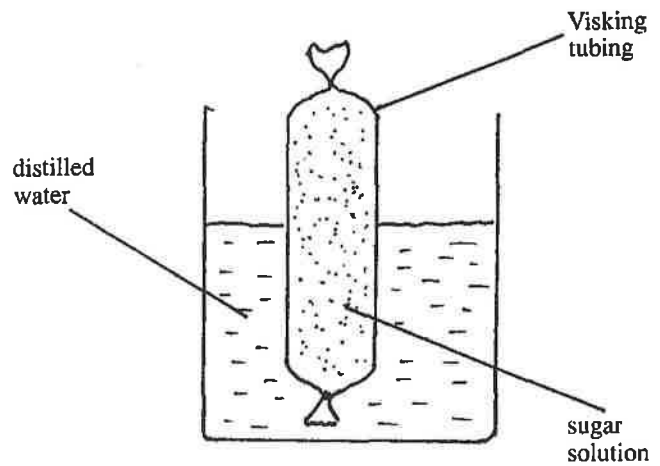
Describe briefly the importance of this process in a living plant.

.....

.....

What part of the cell performs a similar function to the Visking tubing in the experiment above?

.....



6. Name the parts labelled on the diagram of the female mammalian reproductive system.

A. ....

B. ....

C. ....

D. ....

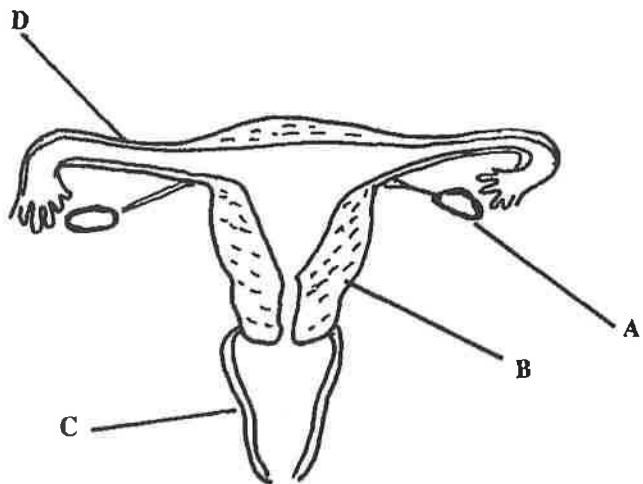
Indicate, by placing the letter X on the diagram, where implantation usually takes place.

How many chromosomes are there in a normal human sperm? .....

State two functions of the placenta

(i) .....

(ii) .....



7. Soil is composed of several constituents including water and humus. In an experiment to determine the amount of water in soil, a sample of fresh soil from the garden was weighed and was found to be 90 grams. It was then dried until all the water was removed, at which point it weighed 75 grams. Calculate the weight of water and the percentage of water in the soil sample.

Weight of water in the soil..... grams

Percentage of water in the soil..... %

The dry soil was then burned to remove all the humus, at which point it weighed 45 grams. Calculate the weight of humus and the percentage of humus in the original soil sample.

Weight of humus in the soil..... grams

Percentage of humus in the soil..... %

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Part I is on a separate sheet which provides spaces for your answers. The completed sheet should be enclosed in your answer book.

**PART II (280 marks)**

Write your answers to this part in your answer book.

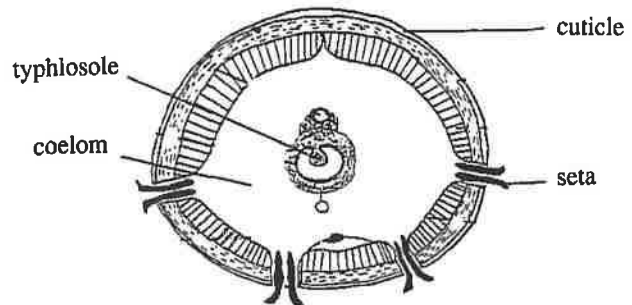
Answer four questions. Each question carries 70 marks.

8. List two characteristics which place the earthworm *Lumbricus terrestris* in the phylum Annelida.

The diagram opposite shows a transverse section through an earthworm.

State a function for each of the following labelled parts:

- (i) typhlosole
- (ii) seta (chaeta)
- (iii) cuticle
- (iv) coelom



State the function of the gizzard in the earthworm.

Earthworms are important in the maintenance of a fertile soil. Give three activities of earthworms which support this statement and in each case explain how the activity improves the soil.

A wormery can be used to illustrate earthworm behaviour. Draw a diagram of a wormery and label four components. (70)

9. (a) Draw a diagram to illustrate a pyramid of numbers in a habitat. Place the words carnivore, herbivore and producer in their correct positions on your diagram.

For each of the trophic levels on the pyramid name an organism from the habitat you have studied.

Describe, with the aid of diagrams, any two of the following and explain the purpose of each of the two you have chosen in a practical study of a habitat:

- (i) quadrat, (ii) pitfall trap, (iii) plankton net, (iv) pooter, (v) beating tray. (34)

- (b) Give three examples of water pollution and three examples of air pollution and state one harmful effect of each example on the environment. (36)

10. (a) Distinguish clearly between red blood cells, white blood cells and platelets under the following headings:
- (i) structure
  - (ii) function
  - (iii) origin or site of formation.

What is serum? (33)

- (b) Draw and label an outline diagram of the heart of a mammal.

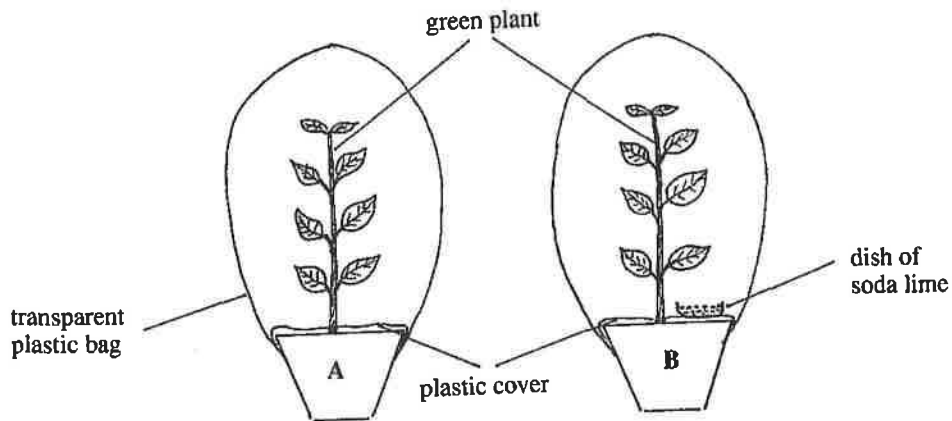
Use arrows to indicate the direction of blood flow.

Use the letter X to indicate the position of the pacemaker and state its function.

State one difference in structure between an artery and a vein. (37)

11. (a) Describe an experiment to extract and separate the photosynthetic pigments in a green leaf. (22)

- (b) The diagram shows the apparatus used in an experiment to show that CO<sub>2</sub> is necessary for photosynthesis.



Before setting up the experiment the plants were destarched. The plants were then placed in a warm sunny situation for several hours.

Answer the following questions.

- (i) How would you destarch the plants?
  - (ii) What is the purpose of destarching the plants?
  - (iii) Why is soda lime placed on pot B?
  - (iv) Why is the soil in both pots covered in plastic?
  - (v) Why are both plants enclosed in plastic?
  - (vi) What test would you use at the end of the experiment which would help you to draw a conclusion?
  - (vii) What results would you expect from this test? (24)
- (c) List five major mineral elements required by a plant for healthy growth and outline the functions of any three of them in the plant. (24)

12. (a) Name three human physical characteristics which are inherited.

An allele is a variant form of a gene. What is meant by multiple alleles?

Give an example of a human characteristic which is controlled by multiple alleles. (30)

(b) In guinea pigs long hair (L) is dominant over short hair (l) and black colour (B) is dominant over brown colour (b). Guinea pigs heterozygous for both of these traits, were crossed with individuals which were homozygous and recessive for both of these traits. The offspring of these crosses consisted of animals with the following phenotypes in equal proportions:

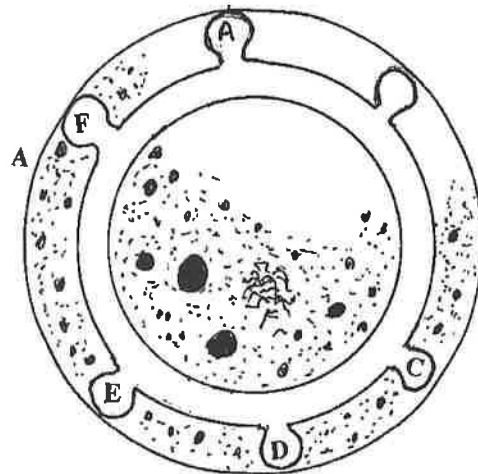
- long-haired black pigs
- long-haired brown pigs
- short-haired black pigs
- short-haired brown pigs

Outline the genetic cross by showing the genotypes of the parents, the genotypes of the gametes and the genotypes of the offspring. (40)

13. (a) Explain the following terms as they relate to bacteria (i) decomposer (ii) pathogen (iii) nitrogen fixer. (18)

(b) A culture of bacteria was streaked on to a Petri dish of sterilised nutrient agar and a multidisc was then placed in the dish and the lid replaced. It was then incubated for 48 hours at 37° C and the results are shown on the diagram opposite.

- (i) What type of substance is present in the tip of each arm of the multidisc?
- (ii) What is the function of the multidisc in the experiment?
- (iii) What conclusion can you draw from the experiment? (18)



(c) Draw and label a diagram of a typical yeast cell.

Describe how a yeast reproduces asexually.

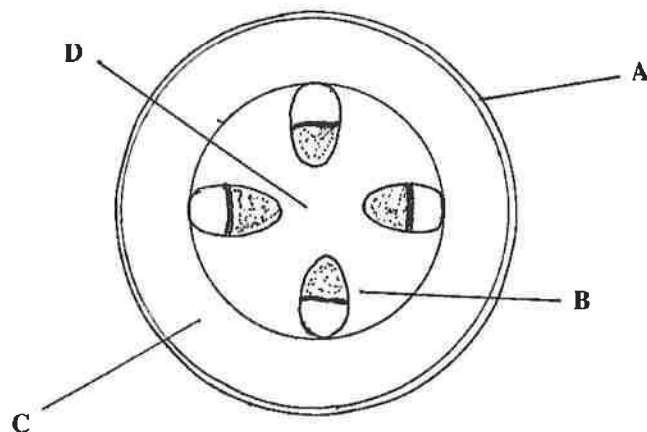
State three ways in which fungi are useful in industry or medicine. (34)

14. (a) The diagram shows a transverse section of a stem of a young dicotyledonous plant.

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

How would a section of a stem of a young monocotyledonous plant differ from this one?

Draw and label a transverse section of a root of a young dicotyledonous plant. (31)



(b) Once produced, seeds can remain dormant for some time.

What do you understand by the term dormant?

Give two advantages of dormancy in seeds.

Germination is the resumption of growth of an embryo in a seed. Name three conditions necessary for the germination of a seed.

Starch is broken down to simple sugars in the seed at the beginning of germination. Why is this necessary? What happens to the simple sugars once they are produced? (39)

15. Answer two of the following

(35, 35)

(a) Explain what is meant by the term denatured enzyme. Name two factors which can cause enzymes to be denatured.

If you were given 10 cm<sup>3</sup> of a standard starch solution and the same volume of a standard solution of amylase enzyme, describe an experiment you would undertake to show the effect of pH on the action of the enzyme on the starch.

(b) Explain the term transpiration. List three environmental conditions which would affect the rate of transpiration and explain how it is affected by each one.

If you were given some coloured water how would you use it to show the movement of water through a plant?

(c) A person who was sitting naked in a cold room began shivering involuntarily after a while. Name the stimulus, the sense organ and the response involved in this event. What is the name for this type of nervous action?

State three ways in which body temperature can be regulated in a mammal.

Draw and label a diagram of a typical motor neuron.

(d) What do you understand by the term tropism? Name and explain two different kinds of tropism.

Outline two uses of plant hormones in horticulture or agriculture.

Describe an experiment to show the growth of the radicle of a seedling when the effects of gravity are removed.