

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

Write Your
Examination
Number here

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA
LEAVING CERTIFICATE EXAMINATION, 1998
BIOLOGY — ORDINARY LEVEL

WEDNESDAY, 17 JUNE — AFTERNOON 2.00 to 5.00

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) Catalysts made from protein molecules in cells are called
- (b) A bronchiole is a small tube found in the of mammals.
- (c) Food is absorbed through fingerlike projections in the small intestine called.....
- (d) A gene is a small part of a large molecule called
- (e) Ecology is a study of the relationships between organisms and their

2. The diagram shows an experiment set up to demonstrate the presence of micro-organisms in the air. Both flasks and their contents had been sterilised at the start of the experiment. They were then left in a warm place for several days.



What would you expect to see in each flask? Give a reason for your answer.

Flask A

Reason.....

Flask B

Reason.....

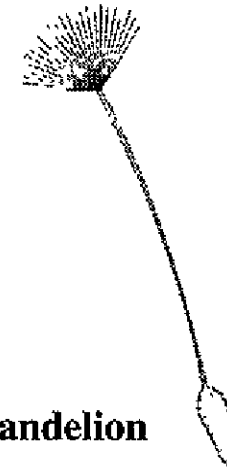
How might the flasks have been sterilised?.....

.....

An experiment like this was performed by Louis Pasteur (1822-1895). Name a process used today which commemorates Pasteur's name.

.....

3. The diagram shows a fruit from a dandelion.



What method of dispersal does the plant use?

State one advantage and one disadvantage of this method of dispersal.

Advantage

Disadvantage

Name two other methods by which seeds may be dispersed.

1.

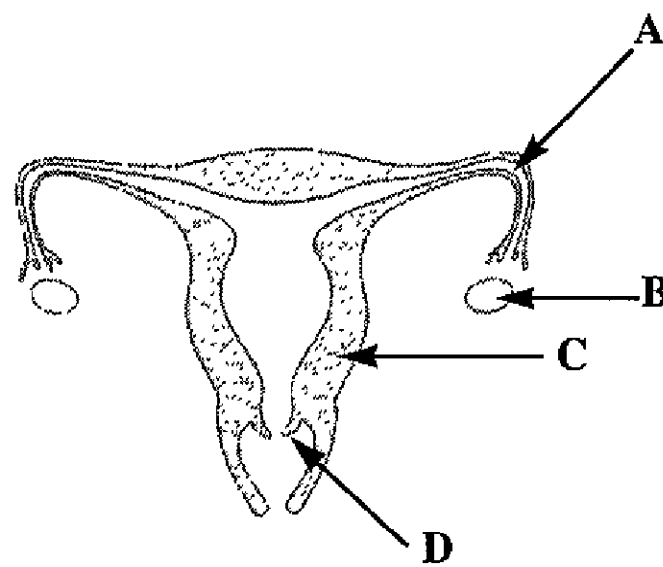
2.

Apart from water, name two other essential requirements for the successful germination of a seed.

1.

2.

4. The diagram shows the human female reproductive system.



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

A. B.

C. D.

Which letter on the diagram shows where the eggs (ova) are produced?

How many chromosomes does the nucleus of the egg contain before fertilisation?

How long does the developing baby normally remain inside the mother before birth?

5. Indicate whether each of the following statements is true or false by putting a circle around the appropriate letter T or F.

	True	False
Example. <i>Herbivores have no incisor teeth.</i>	T	F
(a) Muscle can do work by contracting only.	T	F
(b) Fungi contain the pigment chlorophyll.	T	F
(c) In the human skeleton a tendon joins a bone to another bone.	T	F
(d) Deciduous trees do not shed their leaves in winter.	T	F
(e) The bark of a tree consists of the tissues outside the vascular cambium.	T	F
(f) Proteins are essential for body growth and repair.	T	F
(g) Heterotrophic organisms make their own food using light as an energy source.	T	F
(h) Slugs and snails belong to the phylum Mollusca.	T	F
(i) Insects have 8 legs.	T	F
(j) Magnesium is the chemical element essential for the production of the blood pigment haemoglobin.	T	F

6. Some pea seeds were soaked in water and placed in a vacuum flask and a thermometer inserted as shown.

Before the experiment the seeds were rinsed with disinfectant. Why is this necessary?

.....

What control experiment should be set up?.....

.....

.....

After a few days what temperature change might be observed?

.....

.....

Explain your answer to this last question.

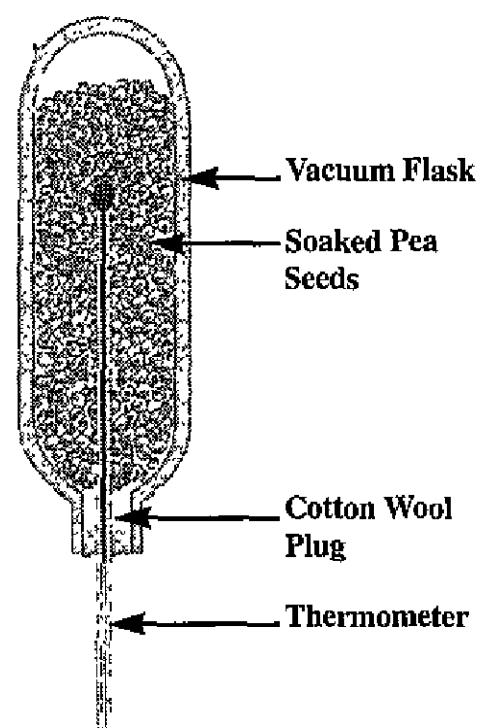
.....

.....

Why is a vacuum flask used in this experiment?

.....

.....



7. The underlined term in each of the following groups of four terms is an "odd man out". Give one reason that the underlined term is different, and one reason to explain what the other three terms in the group have in common.

Example: crocodile tortoise frog lizard

The frog is an amphibian.

The others are reptiles.

humerus femur radius ulna

Reason 1.....

Reason 2.....

rickets scurvy measles night blindness

Reason 1.....

Reason 2.....

root hair mycelium hypha sporangium

Reason 1.....

Reason 2.....

wasp spider mosquito house fly

Reason 1.....

Reason 2.....

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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)

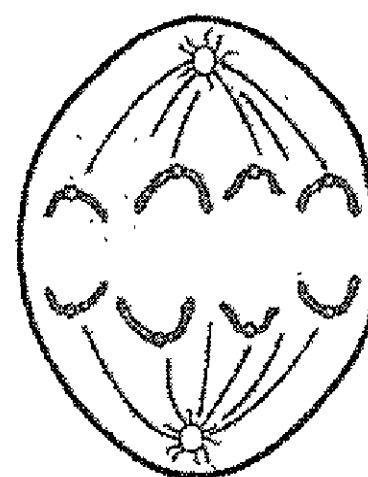
Write your answers to this part in your answer book.

Answer **four** questions. Each question carries 70 marks.

8. (a) (i) Define the term hormone. In mammals hormones are produced by endocrine glands. State one way in which an endocrine gland differs from an exocrine gland such as a salivary gland.
- (ii) Draw an outline diagram of the human body, and show the position of four named endocrine glands. In the case of each of any two of the named glands, name one hormone produced and state its function in the body.
- (iii) State one way in which hormonal and nervous control in the body differ from each other. (39)
- (b) (i) Phototropism is a bending growth of parts of a plant in response to a light stimulus. Describe an experiment you would carry out to demonstrate phototropism.
- (ii) Auxins are a group of plant growth regulators (also called "plant hormones"). State two ways in which plant growth regulators can be of use to the farmer or gardener. (31)

9. (a) The diagram shows a cell in the process of mitosis.

- (i) Name the phase shown in the diagram.
- (ii) Describe what happens during this phase of mitosis.
- (iii) How many cells will result from this division?
- (iv) How many chromosomes will there be in each of these cells? (18)



- (b) Human males possess an X and a Y chromosome (XY) and human females possess two X chromosomes (XX). By means of a simple cross-diagram, explain why there is a 50% (or 1 in 2) chance that a baby will be born a boy. (27)
- (c) In the ABO system of blood grouping there are four blood groups, namely A, B, AB, and O. Inheritance of blood group is determined by the presence of A, B and O alleles.
- (i) Write down the possible genotypes for each blood group.
- (ii) Which group is known as the universal donor? (25)

10. (a) A factory was found to be discharging toxic (poisonous) waste into a nearby river. The concentration of the waste was measured at regular distances downstream from the factory and the results are shown in the table below.

Distance from factory (m)	0	200	400	600	800	1000
Concentration of waste (mg/l)	50	31	20	13	8	4

- (i) Using graph paper, plot a graph of these results. Put distance on the horizontal axis.
- (ii) From the graph estimate the concentration of the pollutant at 300 m from the factory.
- (iii) Suggest a reason for the decrease in the concentration of the pollutant from its point of discharge to 1000 m from the factory.
- (iv) Suggest a type of pollutant that might have been discharged into this river.
- (v) Apart from water pollution, give one other example of pollution. (34)

- (b) (i) Explain any four of the following terms as used in ecology:
omnivore, biosphere, habitat, community, food niche.
- (ii) Physical, chemical and geographical factors affect the distribution of living organisms. Give one example in each case to illustrate the underlined terms. (36)

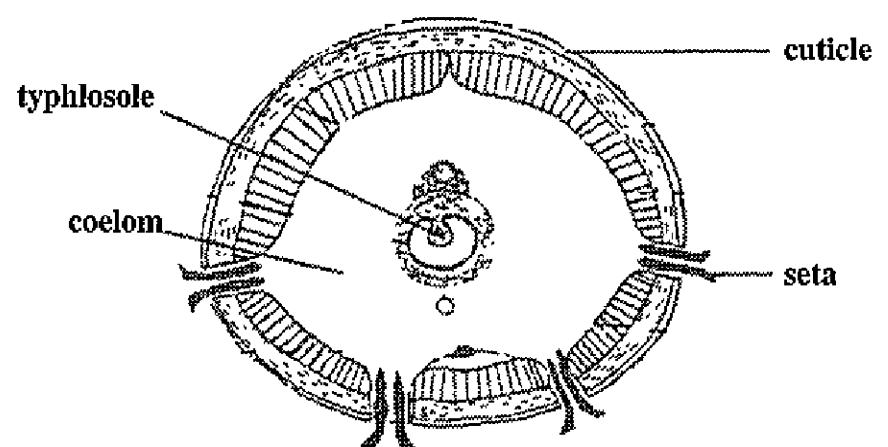
11. (a) (i) What is meant by excretion?
- (ii) Draw a diagram of the human urinary system and label the following: renal artery, kidney, ureter, urethra, bladder.
- (iii) Name two substances normally found in human urine.
- (iv) Name two excretory organs in the human other than the kidney and name one waste material produced by each of them. (40)

- (b) (i) Define the term osmosis.
Describe an experiment to show the process of osmosis.
- (ii) An *Amoeba* living in a freshwater pond contains a contractile vacuole. State the function of this structure and explain why its presence is necessary. Why does an *Amoeba* living in seawater not possess a contractile vacuole? (30)

12. (a) To what phylum does the earthworm (*Lumbricus*) belong? Give two reasons for placing the earthworm in this phylum.

The diagram shows a section through an earthworm. State one function for each of the following labelled parts:

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



State three activities of earthworms which maintain a fertile soil and in each case explain how the activity improves the soil. (39)

- (b) Name a habitat where you might expect to find the green alga *Spirogyra*.
Draw a large diagram of a single cell of *Spirogyra* and label the following: mucilage layer, cell wall, chloroplast, nucleus.
How does *Spirogyra* reproduce asexually?
State four structural differences between *Spirogyra* and a flowering plant such as a buttercup. (31)

13. (a) (i) Give two reasons that food preservation is important.
- (ii) State three methods by which food may be preserved, and explain how each method is effective.
- (iii) Name two foods which are rich in protein. Describe a test which can be carried out to show the presence of protein in a food. (42)
- (b) (i) Explain the term photosynthesis.
- (ii) In flowering plants, photosynthesis occurs mainly in the leaves. Draw a large labelled diagram of a vertical section through a leaf.
- (iii) Describe four ways in which the structure of a leaf is adapted to perform photosynthesis. (28)
14. (a) (i) Name the liquid part of the blood and state two of its functions.
- (ii) Apart from colour, give two differences between red and white blood corpuscles. Where are the red blood corpuscles manufactured in the body?
- (iii) Several major blood vessels are attached to the heart. Name three of these vessels and, in each case, answer the following;
- from where does the blood arrive in this vessel?
- to where is it being carried? (45)
- (b) Transpiration is the loss of water vapour from inside a plant to the atmosphere outside.
- (i) Name two factors that affect the rate of transpiration.
- (ii) Describe an experiment to measure the rate of transpiration in a plant shoot. (25)
15. Answer *two* of the following: (35, 35)
- (a) Give an example of an insect that shows (i) complete metamorphosis, (ii) incomplete metamorphosis. In each case outline the stages in the life cycle.
- Write short notes to explain the following terms: compound eye, spiracle, ecdysis.
- (b) (i) Explain the terms saprophyte, parasite.
- (ii) Name one parasitic fungus.
- (iii) Yeast is a fungus that is used in the baking and brewing industries. Explain why yeast is used in these two industries.
- (iv) Draw a large labelled diagram of a yeast cell and explain how this organism reproduces.
- (c) (i) What is meant by a reflex action? Give two examples of reflex actions. What advantage is a reflex action for an animal?
- (ii) Name three regions of the brain and give one function of each region named.
- (iii) State two functions of the human ear.
- (d) (i) State one function in each case for the following plant tissues: parenchyma, xylem, phloem.
- (ii) Explain the term plant meristem. Name two regions of a plant where a meristem is found.
- (iii) Describe how annual rings are formed in a tree. How can they be used to estimate the age of a tree?
- (iv) State the function of each of the following: root cap, lenticel, bark.