

Write your Examination Number here

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AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1987

BIOLOGY—ORDINARY LEVEL

WEDNESDAY, 17 JUNE—MORNING, 9.30 to 12.30

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 muscle that contracts to cause the lifting of the forearm is called the .....
- (b) The part of the eye responsible for controlling the amount of light entering the eye is the .....
- (c) The tissue in a flowering plant through which water is transported upwards from the root is the .....
- (d) Name the endocrine gland located at the front of the neck which secretes the hormone thyroxine. ....
- (e) Name the process by which water enters a cell .....

2. The diagram shows apparatus set up for an experiment which was carried out in the laboratory in daylight.

Suggest a suitable title for this experiment .....

.....

What gas collects in the test tube during the experiment?

.....

What simple test would you carry out to identify this gas?

.....

.....

Suggest how you would measure the rate of gas production in this experiment.

.....

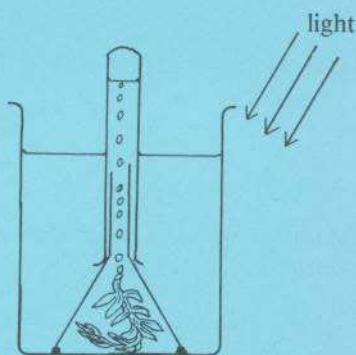
Sodium bicarbonate was added to the water in the beaker at the start of this experiment. Suggest a reason for this.

.....

Name two environmental factors that could affect the rate of gas production.

(i) .....

(ii) .....



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

**Example:** All leaves are green.

	True	False
	T	<b>F</b>
(a) Intercostal muscles are located between the ribs.	T	F
(b) The node of a stem is the tip of the stem.	T	F
(c) Earthworms have a coelom.	T	F
(d) The mineral element phosphorus is required by plants <i>and</i> animals.	T	F
(e) Herbivores have no incisor teeth.	T	F
(f) Lymph contains blood plasma.	T	F
(g) Light directly affects the rate of transpiration in plants.	T	F
(h) Viruses are saprophytes.	T	F
(i) Rods and cones are found in the retina of the eye.	T	F
(j) When using a light microscope in the laboratory you should use the high power objective lens first.	T	F

4. The diagram shows the life cycle of the locust. Name the phylum to which the locust belongs.

.....

Give two reasons for choosing that phylum.

(i) .....

(ii) .....

What is meant by metamorphosis?

.....

.....

What type of metamorphosis does the locust life cycle demonstrate?

.....

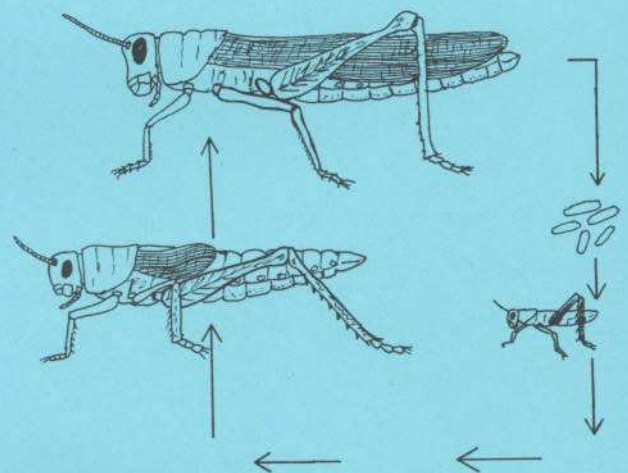
What is meant by ecdysis?

.....

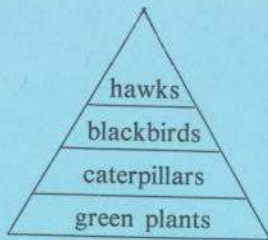
Why is ecdysis necessary?

.....

.....



5. The diagram shows a pyramid of numbers from an ecosystem.



(i) Which organism in this pyramid is an autotroph?

- green plants       caterpillars   
 blackbirds       hawks

(ii) The greatest amount of energy in this pyramid is found in the

- green plants       caterpillars   
 blackbirds       hawks

(iii) The food chain illustrated by this pyramid is

- hawks → blackbirds → caterpillars → green plants   
 green plants → caterpillars → blackbirds → hawks   
 caterpillars → green plants → blackbirds → hawks   
 blackbirds → caterpillars → hawks → green plants

(iv) The primary consumer in this pyramid is the

- green plant       caterpillar       blackbird       hawk

(v) This pyramid suggests that, in order to live and grow, one hundred blackbirds would require

- less than 100 green plants   
 100 caterpillars   
 more than 100 caterpillars   
 no caterpillars

6. (a) State where the following are found in the mammal.

- (i) Cerebrum.....  
 (ii) Trachea.....

(b) Give a biological reason for each of the following:

(i) A farmer spreading farmyard manure on his land.

.....  
 .....

(ii) Having fibre in your diet.

.....  
 .....

(iii) Urine is more concentrated in hot than in cold weather.

.....  
 .....

7. The diagram shows a section through mammalian skin. Give the appropriate letter (or letters) which indicate each of the following on the diagram.

*Structure*

*Letter*

sweat gland .....

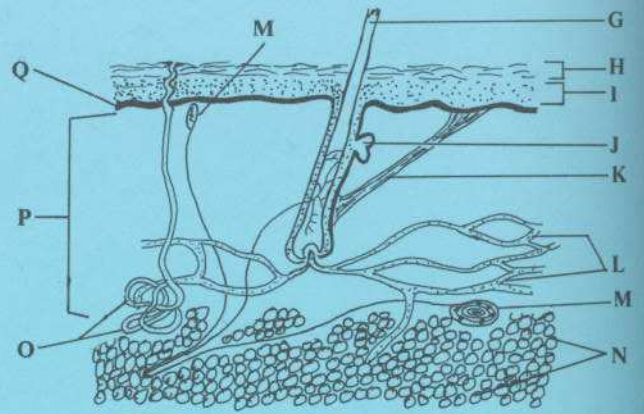
erector muscle .....

sensory receptor .....

dermis .....

malpighian layer .....

A part especially concerned with thermal insulation .....



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## BIOLOGY—ORDINARY LEVEL

WEDNESDAY, 17 JUNE—MORNING, 9.30 to 12.30

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)

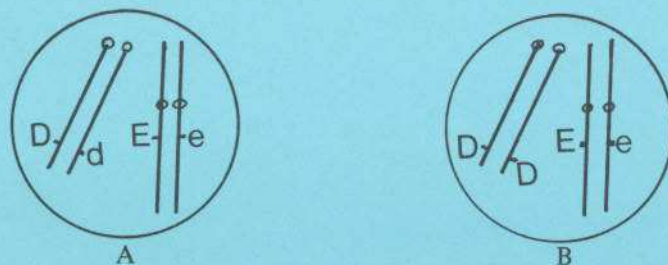
Write your answers to this part in your answer-book.

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

8. Draw a large labelled diagram to show the structure of *Amoeba* and label the following parts: contractile vacuole, pseudopodium, ectoplasm (plasmagel), endoplasm (plasmasol), plasma membrane. Label two other major parts of *Amoeba* not given in the above list. (30)  
Outline the method of (a) movement, (b) feeding, (c) reproduction, in *Amoeba*.  
Give two differences between *Amoeba* and a cell of *Spirogyra* which help you to classify *Amoeba* as an animal and *Spirogyra* as a plant. (40)

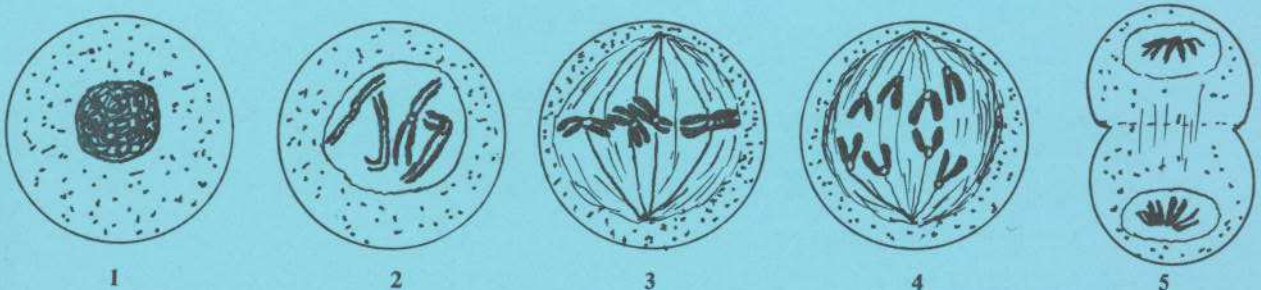
9. (a) Give the meaning of the terms allele and locus in genetics.

In a species of organism the allele **D** is dominant over the allele **d** and the allele **E** is dominant over **e**. The chromosome diagrams show the genotypes of two members, A and B, of the species of organism.



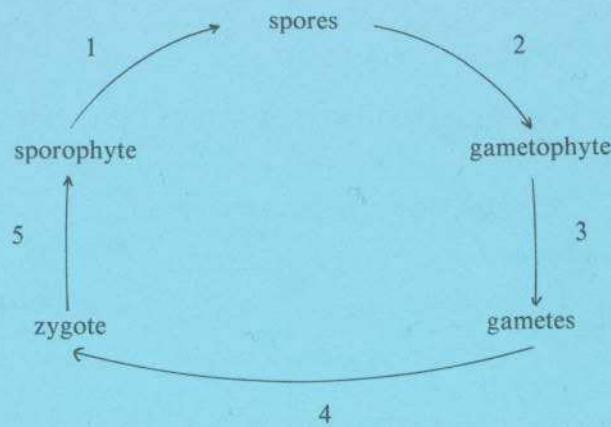
- (i) Do these two organisms have the same phenotype? Explain your answer.  
(ii) Give the possible genotypes of the gametes produced by each organism.  
(iii) If A was crossed with B could any of the offspring have the genotype **ddce**? Explain your answer. (36)

- (b) The diagrams show the stages of mitosis in their correct order.



Describe briefly what each diagram shows. State two ways in which the cells that result from meiosis differ from those that result from mitosis. (34)

10. The diagram summarises the life cycle of a plant which shows alternation of generations.



- (i) Name a plant you have studied which shows alternation of generations in its life cycle. For each of the changes marked 1 to 5 on the diagram state whether the change involves mitosis, meiosis or fertilization. (18)
- (ii) Draw a large labelled diagram of the sporophyte stage of the plant you have named. Outline, with the aid of simple diagrams, how the spores are dispersed by the sporophyte. (36)
- (iii) Dispersal of seeds or spores of a plant benefit the plant by reducing competition and allowing colonization to be carried out by the plant. Give a brief ecological explanation of the two underlined terms. (16)

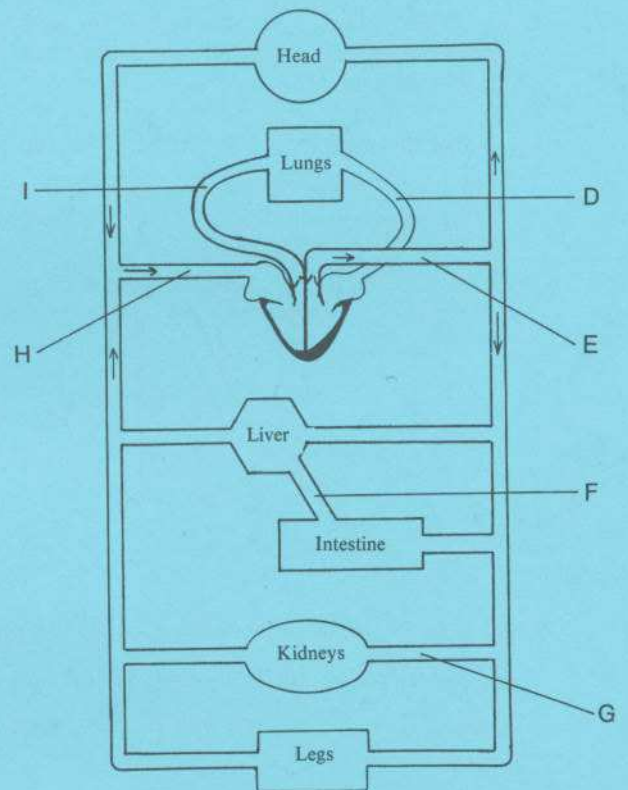
11. (i) The diagram represents the blood circulatory system of a mammal.

Name the blood vessels labelled D, E, F, G, H, I.

In which of the labelled blood vessels would you expect the blood to contain the highest concentration of

- (a) oxygen,
- (b) carbon dioxide,
- (c) digested food?

Give the reason for your answer in each case. (30)



- (ii) Outline the changes which occur in the composition of the blood as it passes through the kidneys. (12)
- (iii) What is the pulse which you can feel at your wrist? Describe an experiment you could carry out to show the effect of exercise on pulse rate. (28)

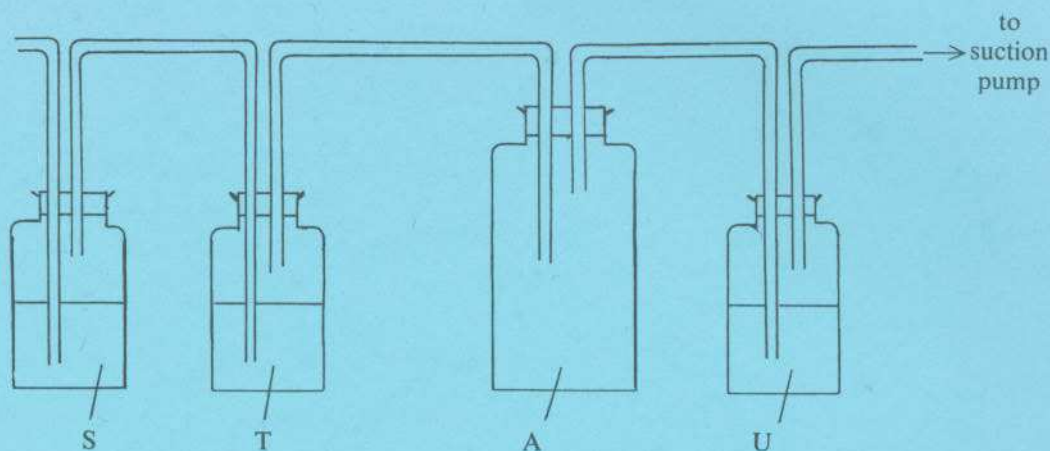
12. (a) Outline how micro-organisms are prevented from entering the human body. Give two methods of defence the body may use against disease-causing organisms which do manage to invade the tissues. The body's natural defences may be assisted by the use of *antibiotics* and *vaccination*. State briefly how each works. (46)
- (b) Below are listed some of the procedures used when growing bacteria or fungi in the laboratory.
  - (i) Use agar jelly with nutrients added.
  - (ii) Sterilize the nutrient agar and the petri-dishes before use.
  - (iii) When pouring the nutrient agar into the petri-dishes open the petri-dish lid as little as possible and close it as quickly as possible.
  - (iv) When examining the growing culture of micro-organisms do so through the lid — do not remove the lid.

Briefly explain the purpose of each of these procedures. (24)

13. What is cellular respiration and why is it essential for all living organisms?  
Give a balanced equation for the process of aerobic respiration.  
State three differences between aerobic and anaerobic respiration.

(34)

The diagram shows apparatus set up to investigate respiration.



- Name the chemicals you would use in flasks S, T and U and state the purpose of each chemical in the experiment.
  - What is the function of the suction pump?
  - Small animals are placed in jar A for a period of time. What changes, if any, would you expect to observe in flasks S, T and U?  
What conclusion can you make from these observations?
  - If you were investigating respiration in a potted plant you would put the pot in a plastic bag and tie the bag around the base of the stem before putting the plant into jar A. It is also necessary to cover jar A with a light-proof cover. Explain the need for these procedures.
- (36)
14. (i) Draw a large labelled diagram of the reproductive system of the human female. Indicate on your diagram the following: (a) where sperm is deposited by the male penis, (b) where fertilisation normally occurs. (28)
- (ii) Draw a large labelled diagram of a vertical section through a named insect-pollinated flower. Indicate on your diagram the following: (a) where pollen is deposited by the insect, (b) where fertilisation occurs. (28)
- (iii) A gardener, wishing to increase the number of a particular variety of strawberry plant in his garden, asks you whether runners or seeds from the parent plant will give new plants identical to the parent variety. State your advice giving the reason for your choice of method. (14)

15. Answer *two* of the following. (35, 35)

- Name the parts labelled S, T, U, V, on the diagram of a tooth.  
Saliva contains an enzyme, amylase.  
State what is meant by the term enzyme and describe a laboratory experiment to demonstrate the action of amylase.
- Explain what is meant by the term pollution.  
Give three examples of pollution, one each for water, land and the atmosphere. For each example you give state the detrimental effect of that pollution on man *and* the environment.
- Name four mineral elements other than carbon, hydrogen and oxygen, necessary for plants and animals. State one function in plants for each of two of the minerals and one function in animals for each of the *other* two minerals you named.  
Outline an experiment to demonstrate the effect of a deficiency of a mineral element on the growth of a plant.
- Draw a diagram of a neuron and label the parts. Explain the terms: stimulus, synapse.  
Describe simply a reflex action.

