

Write your  
Examination Number  
here

**AN ROINN OIDEACHAIS**

**LEAVING CERTIFICATE EXAMINATION, 1977**

**BIOLOGY—HIGHER LEVEL**

**FRIDAY, 17 JUNE—AFTERNOON, 2 to 4.45**

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 120 minutes for Part II.

**PART I (120 marks)**

Answer **six** of the questions (1–7). 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 five of the following.

- (a) A cell is said to be ..... when its protoplasm has collapsed due to loss of water.
- (b) Name a stain which is suitable for testing for DNA in tissues .....
- (c) Give the sex chromosomes present in a human zygote that will develop into a male .....
- (d) The blood vessel which brings blood rich in digested food from the gut to the liver is the  
.....
- (e) Where in the mammal would you expect to find alveoli?.....
- (f) Small gaps between neurons are called .....

2. Each one of the terms in column 3 is related to one of the terms in column 1. Write in column 2 in each case the term from column 3 that most appropriately matches the term from column 1. Use each term once only. The first one is completed as an example for you.

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>
Cerebellum	..... Brain .....	Villus
Osteoblasts	.....	Co-enzyme
Heart beat	.....	Corm
Vitamin	.....	Brain
Protein synthesis	.....	Fovea
Stem	.....	Haversian system
Virus	.....	<i>Amoeba</i>
Retina	.....	Testosterone
Lacteal	.....	Diastole
Male hormone	.....	Ribosome.
Pseudopodium	.....	Obligate parasite

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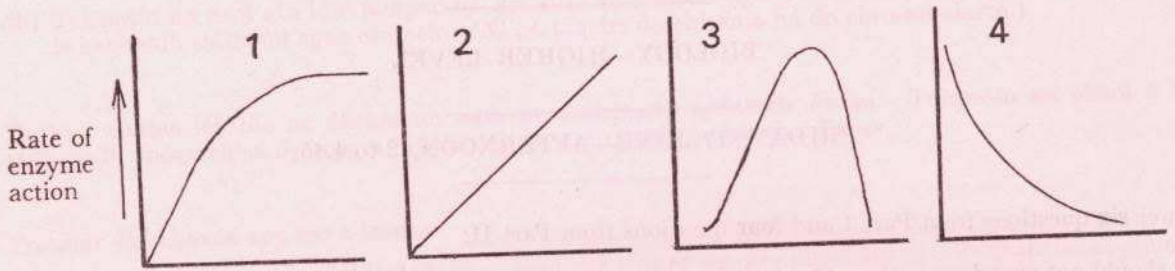
3. (a) In each case indicate which one of the four graphs below best represents the following statements assuming that the enzyme concentration is constant.

“Above a certain substrate concentration the rate of enzyme action ceases to increase”.

Graph number.....

“Increasing the inhibitor concentration causes a decrease in enzyme activity”.

Graph number.....



(b) How is the stomach wall protected from digestion?.....

(c) Describe a laboratory test for protein.....

(d) Select from the following elements  
Hg Sn Pt I Fe Al Mg Pb  
an element that is important in the structure of

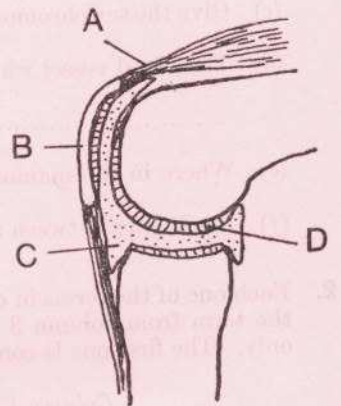
- (i) chlorophyll.....
- (ii) haemoglobin.....

4. (a) Name the structure shown in the diagram

Name the parts labelled.

- A .....
- B .....
- C .....
- D .....

What is the function of D? .....

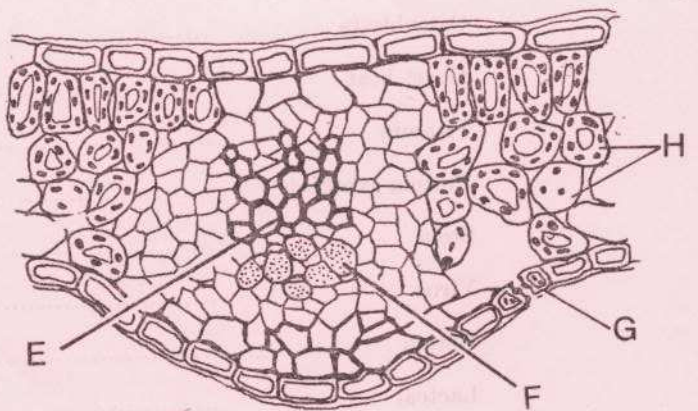


(b) Name the parts labelled in the diagram.

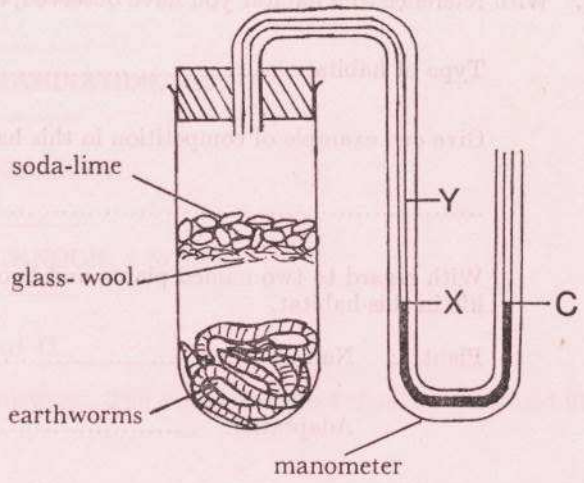
- E .....
- F .....
- G .....
- H .....

Give one function of G.....

.....



5. In an experiment, the apparatus shown in the diagram was kept at a constant temperature. The coloured liquid in the capillary manometer was at the level XC at the start of the experiment. After a period of time the coloured liquid rose to Y.



(a) What was the purpose of the soda-lime?

.....  
 .....  
 .....

(b) How has the composition of the air in the tube changed in the experimental period?

.....  
 .....

(c) Suggest how the earthworms in the tube brought about this change in air composition .....

.....  
 .....

(d) Why was the apparatus kept at constant temperature during the experiment?.....

.....  
 .....

(e) What control should be used in this experiment?.....

.....  
 .....

6. (a) Complete the following table for the three blood groups A, B and AB:

Phenotype	Genotype	May donate to	May receive from
A			
B			
AB			

(b) Complete the following:

..... + Ca + thromboplastin = .....

..... + fibrinogen = .....

[P.T.O.]

7. With reference to a habitat you have observed, answer the following.

Type of habitat.....

Give one example of competition in this habitat.....

.....

With regard to two named plants and two named animals, give one way in which each is adapted for life in this habitat.

Plant 1: Name.....

Adaptation .....

.....

Plant 2: Name.....

Adaptation .....

.....

Animal 1: Name.....

Adaptation .....

.....

Animal 2: Name.....

Adaptation .....

.....

Suggest one way in which simple ecological studies, such as the one you carried out, can be beneficial to-day .....

.....

.....


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## BIOLOGY—HIGHER LEVEL

FRIDAY, 17 JUNE—AFTERNOON, 2 to 4.45

Answer **six** questions from Part I and **four** questions from Part II.

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

8. Explain each of the following and, using a diagram, relate each to the appropriate region of the reproductive system of the female mammal:

(i) ovulation, (ii) fertilisation, (iii) implantation, (iv) placenta formation.

Give a concise account of the part played by hormones in the menstrual cycle.

9. (a) Distinguish between 'antibiotic' and 'vaccine' and give an example of each.

- (b) Give an account of the economic and medical importance of fungi.

You are given a rotting apple with visible fungal growth on it. Outline how you would (i) isolate the fungus and (ii) test the hypothesis that the fungus causes apples to decay.

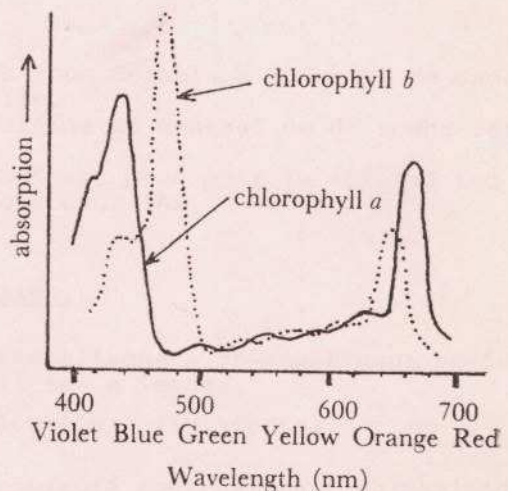
10. (a) Distinguish between the light phase and the dark phase in photosynthesis. Indicate concisely what occurs in each phase.

- (b) Describe how you would demonstrate that there are several pigments present in a chloroplast extract.

- (c) The graph shows the absorption spectra of chlorophyll *a* and *b*.

What information does the graph give about (i) chlorophyll *a*, (ii) chlorophyll *b*?

Why are chlorophyll-containing structures green in colour?



11. Explain the following giving an example in each case:

(i) pyramid of numbers, (ii) food web, (iii) xerophyte.

Describe the initial survey that should be carried out, giving details of methods to be used, in an investigation of a habitat.

12. List the ways by which the human body gains and loses water.

Draw a labelled diagram of a complete nephron and its associated blood supply. How does the nephron manufacture urine?

Comment briefly on the effect each of the following would have on the amount and composition of the urine: (i) eating a protein-rich meal, (ii) a hot day.

[P.T.O.]

13. A variety of maize has a carbohydrate reserve that turns blue when tested with iodine, and is known as 'starchy'. Another variety turns red with iodine and is known as 'waxy'. The difference is due to a single pair of allelic genes and the allele starchy (**S**) is dominant over the allele waxy (**s**). The iodine test can be carried out on the pollen e.g. plants of genotype **SS** produce pollen that turns blue with iodine.
- Give the genotype and phenotype of the  $F_1$  generation for the cross **SS**  $\times$  **ss**.
  - What result would be obtained for the iodine test if it were applied to the pollen of the  $F_1$  progeny? Comment as to whether or not this result complies with Mendel's law of segregation.
  - Indicate the relationship between the behaviour of chromosomes in meiosis and fertilization and the inheritance of the alleles for starchy and waxy.  
(Reference to chiasmata and crossing-over not required.)

14. Give an illustrated account of the structure and sexual reproduction of *Fucus*. Show how sexual reproduction in *Spirogyra* differs from that in *Fucus*.

15. Answer two of the following:

- Using labelled diagrams describe the life cycle of the liver fluke. Outline how it is adapted to the parasitic mode of life.
- Make a labelled diagram to show the structure of the mammalian ear. State the functions of the ear and indicate the parts concerned with each function.
- Describe, with the aid of a diagram, how you would set up and use a potometer. State what a potometer measures. Comment on the use of an atmometer when carrying out experiments with a potometer.
- Write a short essay on

"Rabies—a threat to Ireland"

