

Write your Examination Number here

[Empty box for Examination Number]

AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1972

BIOLOGY—HIGHER LEVEL

FRIDAY, 16th JUNE—AFTERNOON, 2 to 4.30

Answer six questions from Part I and four questions from Part II. You should not spend more than 40 minutes on Part I, leaving about 100 minutes for Part II.

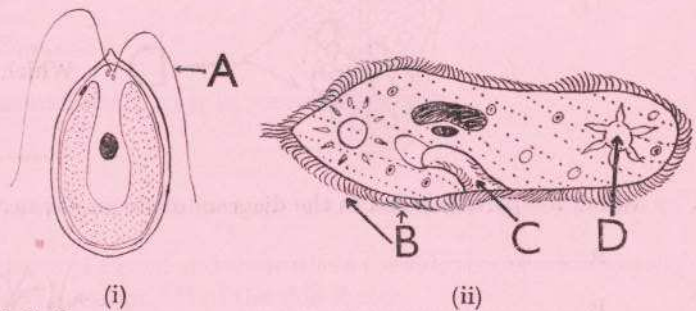
PART I (120 marks)

Answer any six of the questions (1 — 7). Each question carries 20 marks. Write your answers in the spaces provided below. Keep your answers short. Write your examination number at top. Be sure to return the examination paper: enclose it in the answer-book you use for answering Part II.

- 1. (a) What element, together with hydrogen and oxygen, is found in glucose?
(b) What substance is given off during transpiration?
(c) If the diploid number of chromosomes in the nucleus of a cell is six what is the haploid number?
(d) Name one place in the body that produces red blood corpuscles.
(e) To what organ does the eustachian tube link the pharynx?
(f) What word is used in ecology to denote the place where an organism lives?
(g) What major process is carried out in the mitochondrion?

2. Name the organisms shown in the diagrams:

- (i)
(ii)



Give one function for each of the structures labelled.

- A B
C D

State why the term "producer" can be applied to the organism in diagram (i):

3. Draw a labelled diagram in the space opposite to show the mature zygospore in a culture of Mucor or Rhizopus as seen through a microscope.



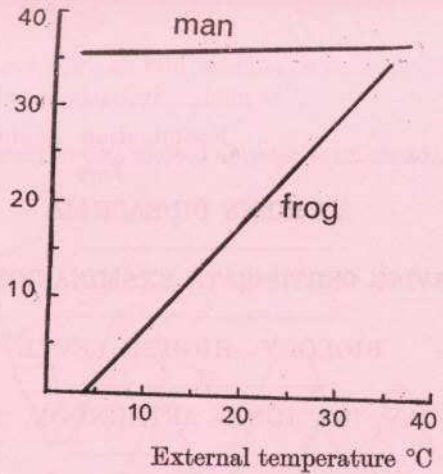
Name the three main types of bacterial cell found in nature:

- (i) (ii) (iii)

State the type of reproduction used by bacteria:

4.

Body temperature °C



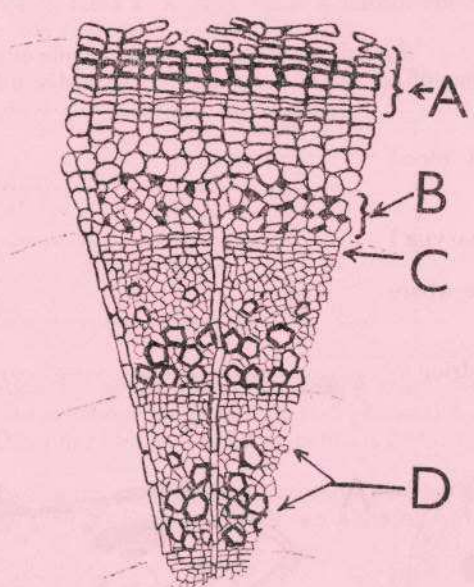
What does the above graph tell us

(i) about the frog? .....

(ii) about man? .....

How does the frog adapt his pattern of life to low external temperatures?

5. The diagram below shows portion of a transverse section through a woody stem. Name the parts labelled A, B, C and D.



A.....

B.....

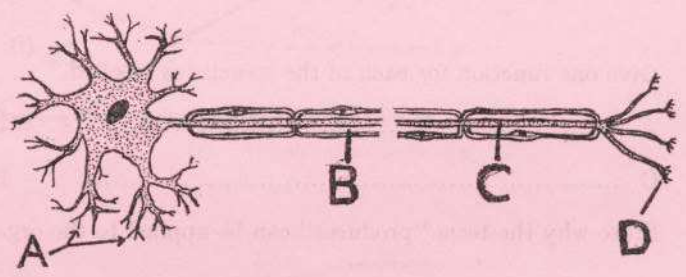
C.....

D.....

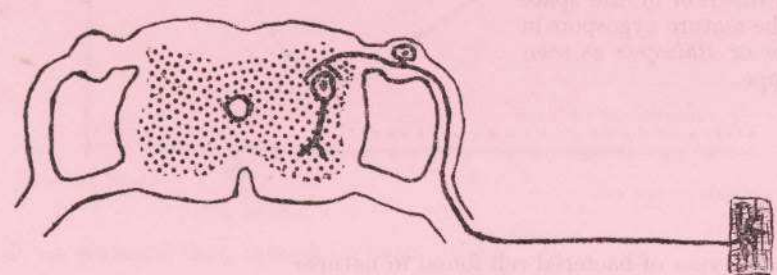
Which of the labelled parts is composed of dead cells?

6. Name the parts labelled in the diagram of the motor nerve cell below:

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



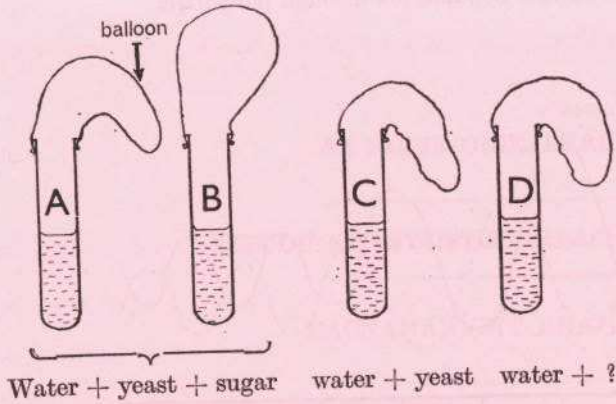
Put in the motor nerve cell in the diagram below.



How does the system work?

.....  
 .....

7.



In an experiment test-tube A is kept at room temperature. Test-tubes B, C, D are incubated at 37°C for 30 minutes.

Results: Balloon A inflates slightly. Balloon B inflates considerably. Balloons C and D show no change.

Why do balloons A and B inflate?

.....  
 .....

Why does B inflate more than A?

.....  
 .....

Test-tubes C and D are controls in this experiment.

(i) Why is there no inflation in the case of balloon C?

.....

(ii) What substance together with water would you put in D?.....

**PART II (280 marks)**

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

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

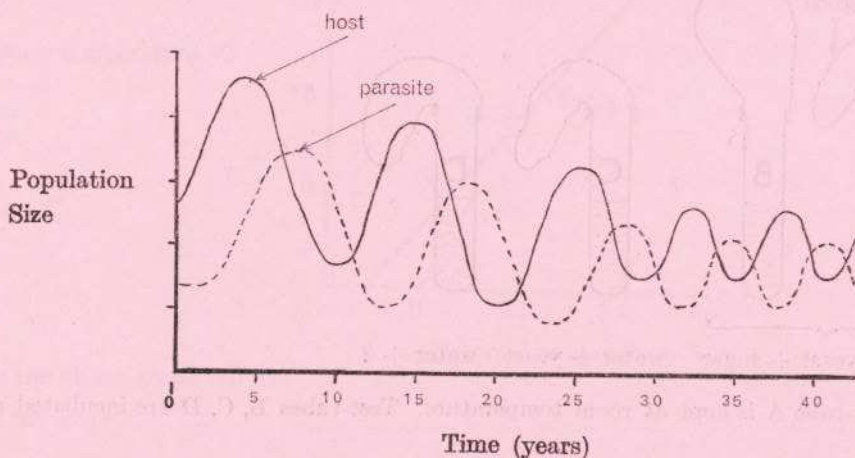
**When you have finished be sure to enclose the whole examination paper in your answer-book.**

8. A gardener tells you that cutting off the top of a stem of a plant causes that stem to produce side shoots at several points below the cut.
  - (i) Draw a simple diagram of the external features of a stem and show where the side shoots are initiated.
  - (ii) Explain why removal of the stem top allows development of the side shoots.
  - (iii) Describe an experiment you would carry out to test your hypothesis in (ii).
9. State what you understand by fertilization. Describe briefly the process of fertilization in a flowering plant. Explain (i) cleavage, (ii) gastrulation, with reference to development in an animal you have studied. Outline the chief functions of the ectoderm and endoderm in the process of development.
10. Relate the structure of the leaf to the process of photosynthesis. If you were given some pond weed outline how you would investigate the hypothesis that light intensity affects the rate of photosynthesis at a given temperature and carbon dioxide concentration. Photosynthesis can be considered to be composed of two stages, a light stage and a dark stage. Briefly explain the basis for this division.
11. Describe the structure and function of (i) an artery, (ii) a vein. What is meant by a portal system? List three major functions of the liver. Explain how the liver fulfils two of these functions.

**PART II CONTINUED OVER →**

12. Describe diagrammatically the life cycle of a named parasitic animal. Outline the problem the parasite has in relation to dispersal and indicate how it overcomes this problem.

The graph shows the interaction of two animal populations through parasitism.



What does the graph tell you about the two populations

- (i) over the first 10 years shown,
- (ii) from the 30th year on?

13. Explain clearly the terms (i) chromosome, (ii) gene, (iii) dominance, (iv) mutation.

In peas the character round seed (R) is dominant over wrinkled (r) and yellow seed (Y) is dominant over green (y). Describe the genotypes and phenotypes found in the F<sub>2</sub> generation of the cross RRYY × rryy when the F<sub>1</sub> generation is self-fertilized.

14. State briefly the characteristics of enzymes.

In an experiment on the breakdown of starch by an enzyme the following results were obtained:

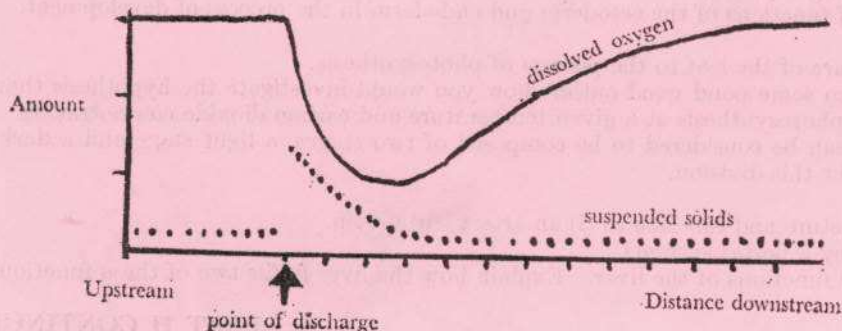
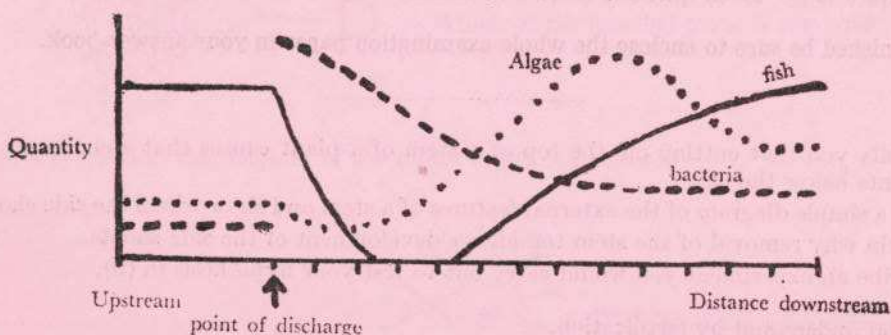
Temperature °C	Rate of Breakdown of Starch
7	4.1
17	10.6
27	17.3
37	22.0
47	18.3
57	8.3

Plot a graph to show how the rate of breakdown varies with temperature.

What does the graph tell you about the action of the enzyme?

Describe briefly how you would carry out this experiment.

15. These graphs show some of the changes that were observed downstream from a point where a large amount of organic waste was discharged into a river (data of Hynes, 1958).



Referring to the graphs explain the changes in

- (i) the number of fish in the river,
- (ii) the amount of dissolved oxygen in the water,
- (iii) the growth of algae in the river.