

Write your
Examination
Number here

AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1979

BIOLOGY—HIGHER LEVEL

FRIDAY, 15 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 five of the following.

- (a) Urea is formed in the.....
- (b) The spiracle on insects is used for.....
- (c) The nephron is located in the.....
- (d) Where is fascicular cambium located?.....
- (e) Pepsin breaks down proteins to.....
- (f) Where is the organ of Corti located?.....

2. Explain the term tissue.....
.....

Give *one* location and *one* function for each of the following tissues.

Ciliated epithelium: Location
Function

Sclerenchyma: Location
Function

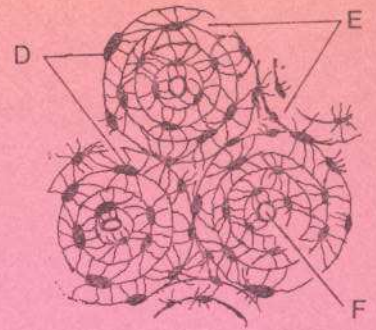
Hyaline cartilage: Location
Function

Phloem: Location.....
Function

Parenchyma: Location
Function

3. (a) The diagram shows a transverse section through bone. Name the parts labelled.

- D
- E
- F



(b) Name the type of bone shown below.

.....

Name the parts labelled L, N, O.

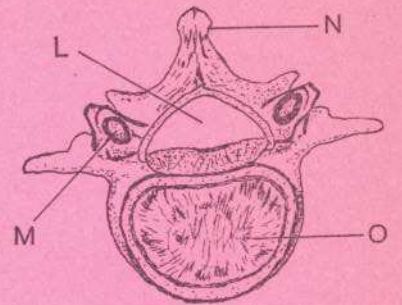
- L
- N
- O

What is present in L during life?

.....

State the function of the part labelled M.

.....



4. (a) Name the parts labelled in the diagram.

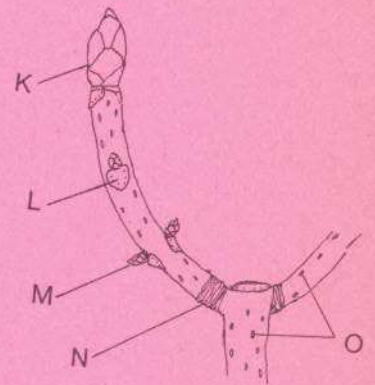
- K
- L
- M
- N
- O

What is the function of O?

.....

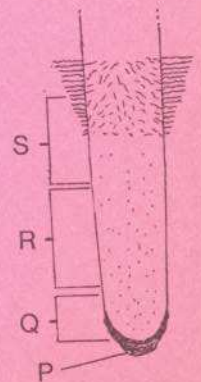
.....

How old is the twig?



(b) Name the zones labelled P, Q, R, S, on the diagram of part of a young root.

- P
- Q
- R
- S

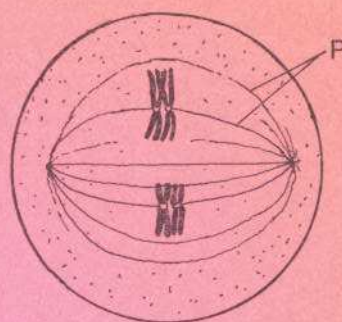


5. (a) What type of cell division is shown in the diagram?

.....

What stage of that division is shown?

Name the structure labelled P.

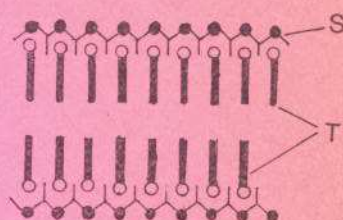


(b) The diagram indicates the molecular structure of a cell membrane.

Name the parts labelled.

S

T



6. (a) Distinguish between essential amino acids and non-essential amino acids in relation to diet.

.....
.....

What type of food is a good source of proteins containing the essential amino acids (i.e. first-class proteins)?

(b) Give a laboratory use for three of the following:

Biuret test (or Millon's test)

Clinostat

Bicarbonate indicator

Cobalt chloride

7. The diagram shows an external view of the human brain. Name the parts labelled.

D

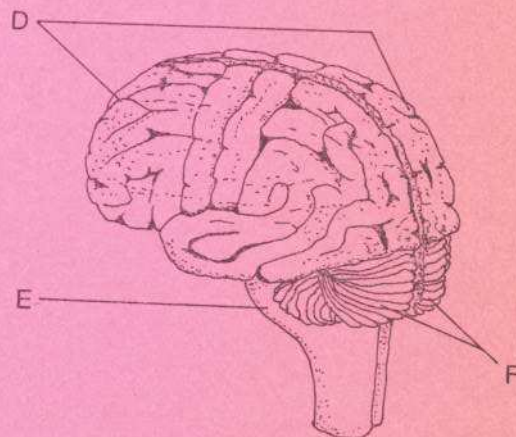
E

F

State a function of the part labelled F.

.....

.....



Insert the letters X, Y, Z in the diagram to show in each case the region concerned with

Vision (X),

Hearing (Y),

Speech (Z).

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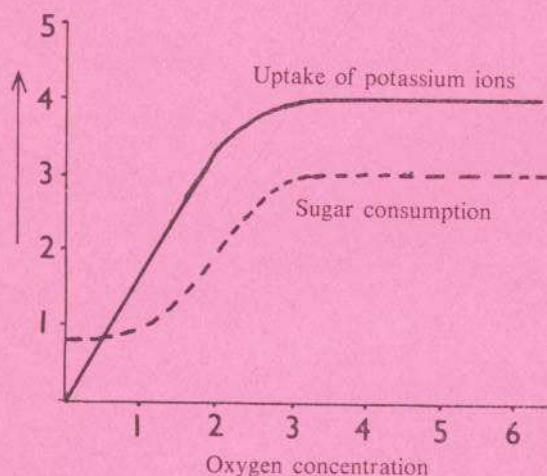
Part I is on a separate sheet which provides spaces for your answers. The completed sheet should be enclosed in your answer-book.

PART II (280 marks)

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

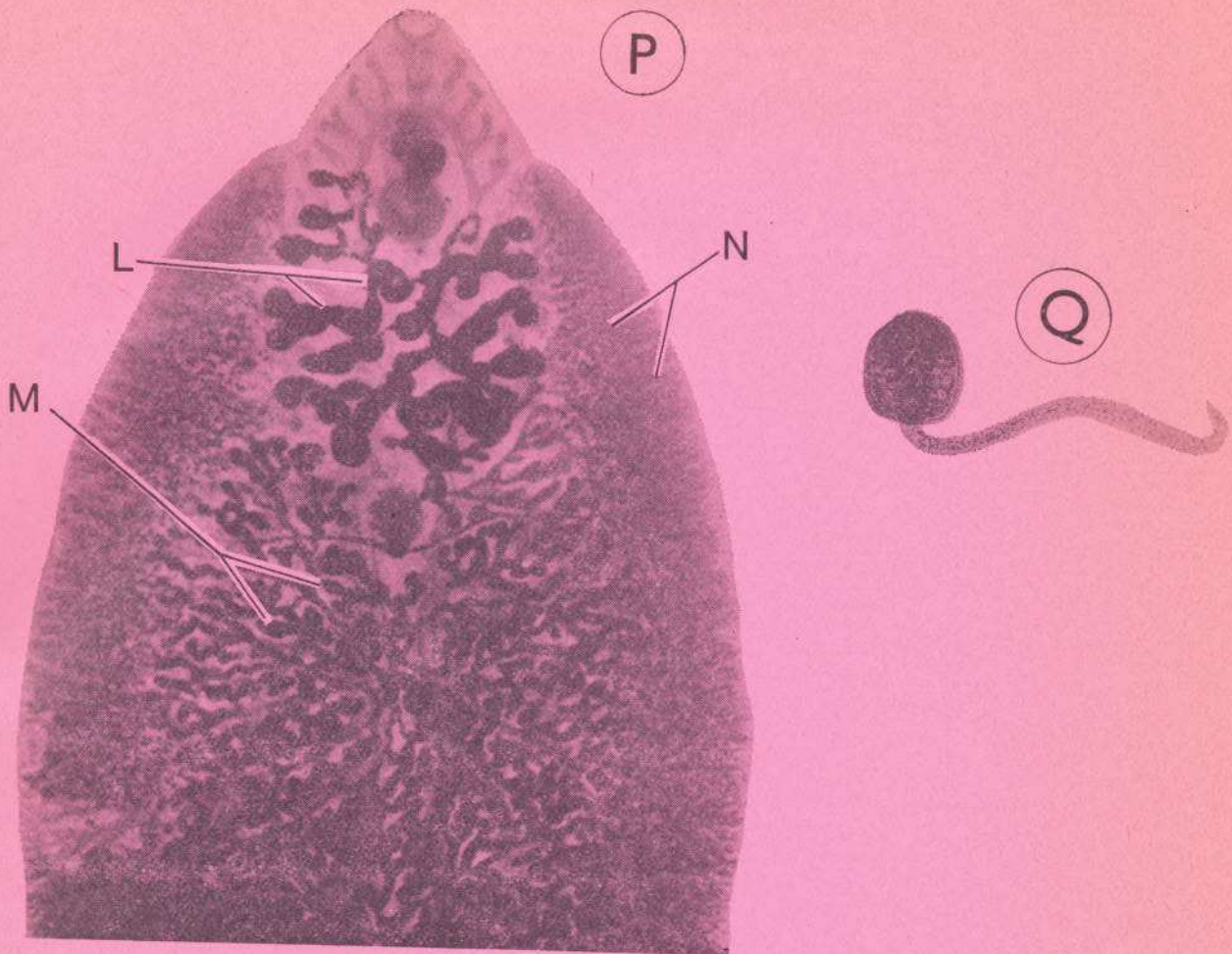
Answer **four** questions. Each question carries 70 marks.

8. (a) Describe the main features of the complete respiration of a molecule of glucose.
- (b) The graphs show the results of experiments on the uptake of potassium ions and sugar consumption by a plant, over a fixed period of time, plotted at various oxygen concentrations. Describe briefly the results obtained and suggest a hypothesis to explain the relationship between the uptake of potassium ions and the consumption of sugar.



9. (i) Explain each of the following terms: homologous chromosomes; multiple alleles.
- (ii) In the inheritance of the human **ABO** blood groups the alleles **A** and **B** are both dominant over the allele **O**.
Show *all* the possible blood groups and their genotypes for the offspring of the following cross:
Parents: Blood group **A** × Blood group **B**
- (iii) Outline the laboratory method by which the blood group of a blood sample is determined. State briefly the principle on which the method is based.

10. The photographs P and Q are of stages in the life cycle of a parasite.

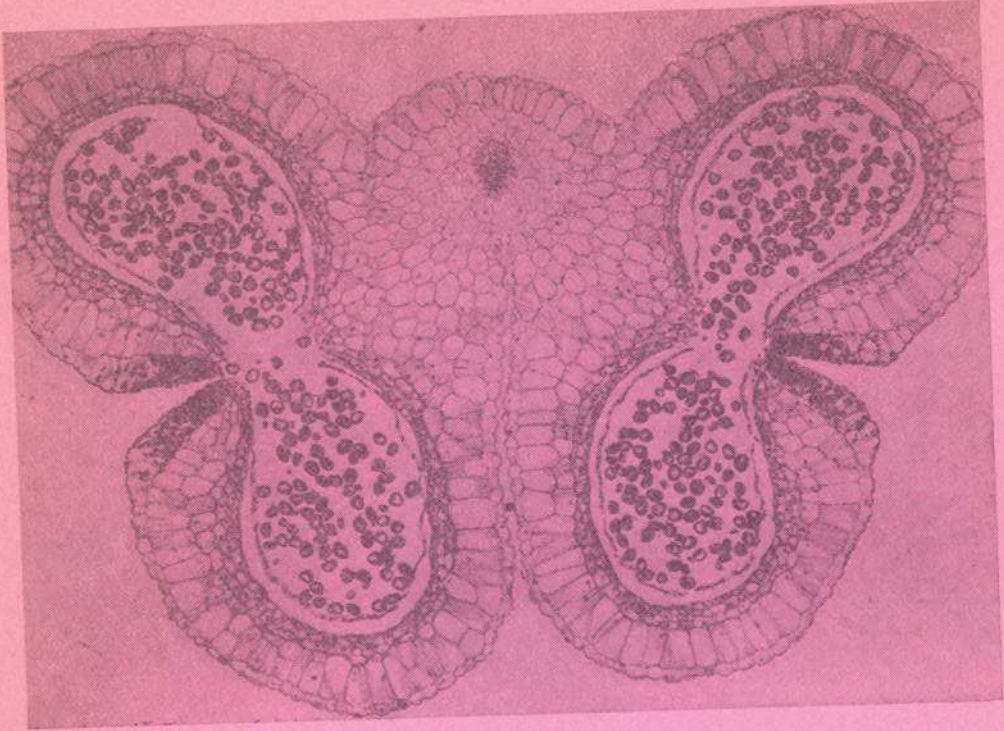


- (i) Name the parasite and each of the stages shown.
 - (ii) Name the structures seen in the regions labelled L, M and N in photograph P.
 - (iii) Name two other structures you can see in photograph P. Make an outline diagram of the parasite and indicate the position of the two structures you name.
 - (iv) Give the functions of any three of the structures you named in (ii) and (iii) above.
 - (v) Give a brief account of the life cycle of the parasite.
 - (vi) Mention two ways in which the parasite is adapted to its mode of life.
11. (a) Distinguish between (i) food chain and food web; (ii) grazing food chain and detritus food chain. 'The number of steps or links in a food chain sequence is limited, usually to four or five.' (Odum.) Comment on this statement in relation to the efficiency of energy transfer in ecosystems.
- (b) Outline why conservation of plants and animals is necessary.
- The International Whaling Commission is currently surveying the minke whale in the Antarctic. At the start of the survey, numbered stainless steel tags are attached to the bodies of 1,500 minke whales and they are then allowed to go free. Making use of the information supplied and your own knowledge of ecological surveying answer the following:
- (i) Suggest how an estimate of the numbers of these whales may be obtained.
 - (ii) Give one other item of knowledge about the ecology of the whales that may be gained through the use of this technique.

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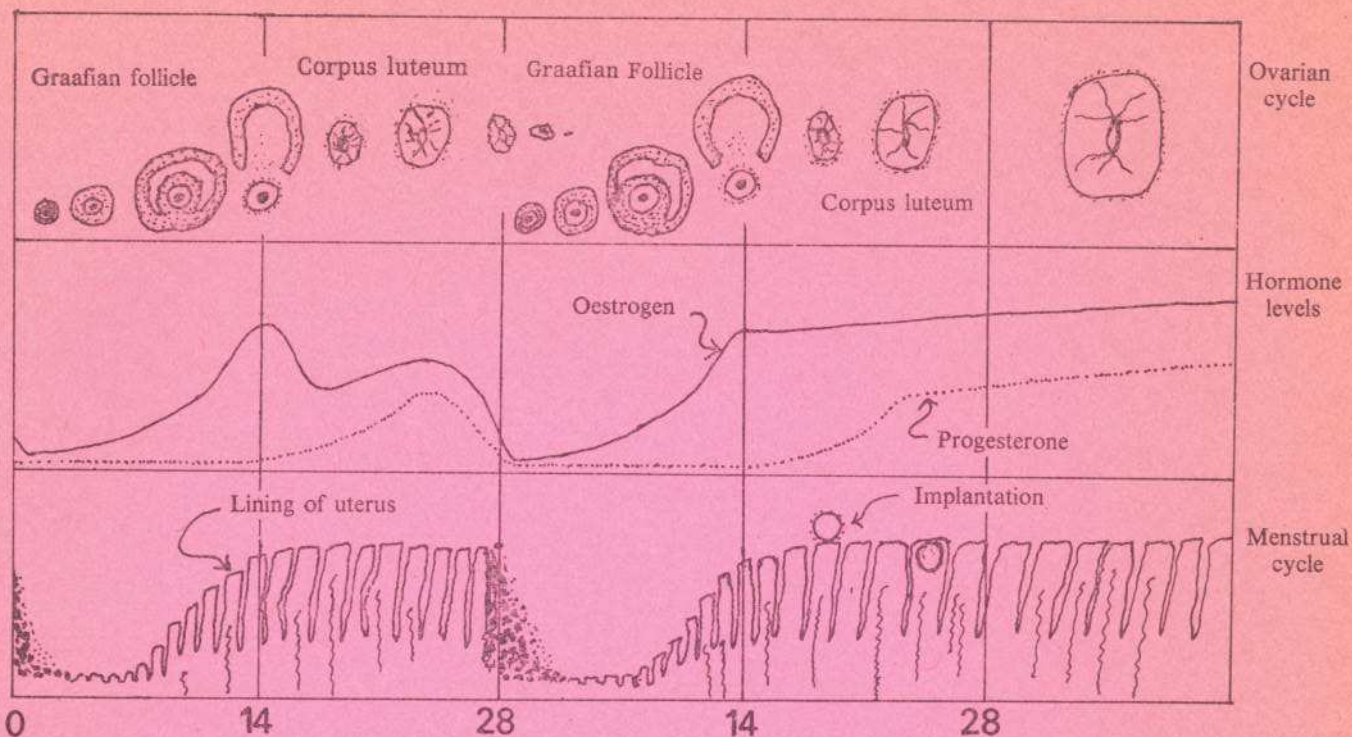
12. (i) The photograph is of a section through an anther.

Make an outline diagram of the section and label the parts. State, with reasons, the stage of development of the anther.



- (ii) 'A pollen grain is a gametophyte and not a gamete.' Comment briefly on this statement.
- (iii) A flowering plant has a diploid chromosome number of 20. How many chromosomes should there be in the nucleus of each of the following cell types in the plant: an egg cell, a pollen mother cell, a cell of the endosperm tissue?
A flower of this plant produced 150 seeds. State the smallest number of each of the following that was necessary to produce the 150 seeds: ovules, pollen tubes, male gamete nuclei.
- (Note: write the names together with the numbers when answering both parts of (iii) above.)

The diagram summarises the changes that take place in a human female in relation to the reproductive cycle.



- Where is the Graafian follicle located?
- Outline the changes taking place in the Graafian follicle during the time shown by the diagram.
- What change in the lining of the uterus wall takes place at the end of the first period of 28 days?
- State briefly what happens to the lining of the uterus during the second period shown.
- Relate oestrogen and progesterone levels to the changes in the Graafian follicle and the lining of the uterus.

14. Answer *two* of the following.

- Describe a laboratory experiment to investigate the effects of a deficiency of each of a number of mineral elements on the growth of a species of plant.
- Describe how you would investigate the effect of temperature on the rate of photosynthesis, e.g. using a green aquatic plant, such as *Elodea*, and using gas production as an indicator of the rate. Draw a graph of the result you would expect.
- You are provided with the following in the laboratory: a semipermeable membrane (e.g. Visking tubing), distilled water, a suspension of starch, a solution of amylase and any glassware you need. Describe how you would set up a model of the small intestine. Explain briefly how the model works. Outline any test necessary to show the model has worked.

15. Write an essay on *one* of the following.

- The biological significance of the properties of water.
- Micro-organisms—beneficial and harmful.