Write your Examination Number here

**AN ROINN OIDEACHAIS**

**LEAVING CERTIFICATE EXAMINATION, 1974**

BIOLOGY—ORDINARY LEVEL

FRIDAY, 21 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 **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 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*) What gas is released as a result of photosynthesis? .....

(*b*) Which one of the following deficiency diseases is caused by a lack of vitamin D:

night blindness, scurvy, rickets, pellagra? .....

(*c*) What tissue in angiosperm plants contains lignin? .....

(*d*) Where is bile produced in the human body? .....

(*e*) Name one place in flowering plants where meiosis occurs. .....

(*f*) Name the process by which energy is released from foods in living cells. .....

(*g*) What gland in the human body produces the hormone insulin? .....

2. (*a*) What effect does contraction of the diaphragm and of the intercostal muscles have on the volume of the thorax?

.....

State three ways in which inspired air differs from air exspired from the lungs.

(i) .....

(ii) .....

(iii) .....

(*b*) Where in the mammal are excess amino-acids converted into urea?

.....

What happens to the urea?

.....

.....

3. *Chlamydomonas, Fucus, Amoeba, Paramoecium*, liverfluke (or tapeworm), viruses, bacteria.

Which organisms in the list above

(*a*) have contractile vacuoles?

.....

(*b*) are always parasitic?

.....

(*c*) photosynthesise?

.....

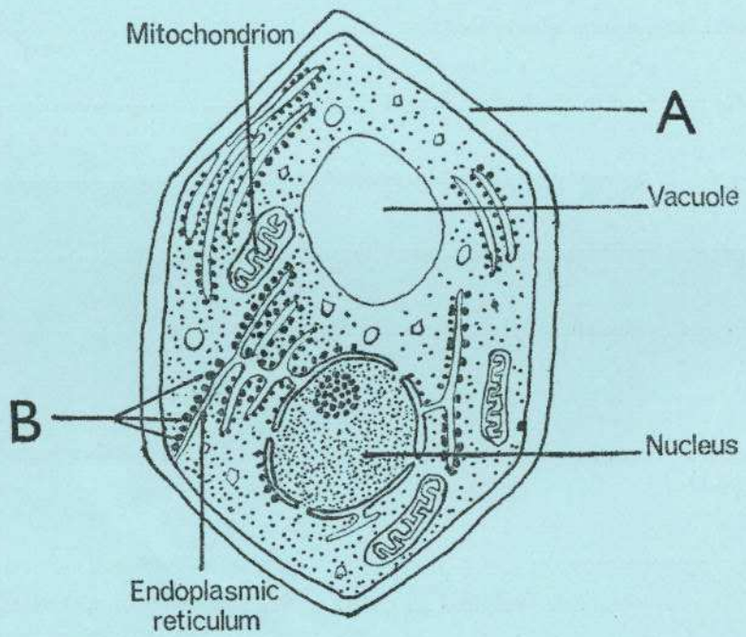
(*d*) are single-celled?

.....

(*e*) do not possess mitochondria?

.....

4. The diagram represents a generalised plant cell as seen with the aid of an electron microscope.




Name the structures marked *A* and *B*.

*A* ..... *B* .....

Is structure *A* fully permeable or semipermeable? .....

State one function of the vacuole.

.....

What process is carried out in the mitochondrion? .....

What type of substances are produced by the structures marked *B*? .....

If this cell were from the mesophyll of a green leaf what additional type of structure would you expect to find in it which would enable it to photosynthesise? .....

5. In the spaces provided, write in whether you think each of the following statements is true or false.

*Example*: Insects belong to the Phylum Arthropoda. TRUE

(*a*) All bacteria cause disease. ☐

(*b*) DNA is found in the nucleus. ☐

(*c*) Foodstuffs absorbed in the small intestine are carried to the liver via the hepatic vein. ☐

(*d*) Oranges are a good source of vitamin C. ☐

(*e*) The type of cell division by which the mammalian zygote divides is called meiosis. ☐

6. Give two structural features which would help you distinguish between:

(*a*) *Amoeba* and *Paramoecium*:

(i) .....

.....

(ii) .....

.....

(*b*) A monocotyledon and a dicotyledon:

(i) .....

.....

(ii) .....

.....

(*c*) A mollusc and a crustacean:

(i) .....

.....

(ii) .....

.....

(*d*) An insect and a spider:

(i) .....

.....

(ii) .....

.....

7. What biological purpose has each of the following activities?

(*a*) sweating: .....

.....

.....

(*b*) the pasteurisation of milk: .....

.....

.....

(*c*) the application of a fungicidal spray to the aerial parts of a potato crop:

.....

.....

.....

(*d*) the positive phototropic growth of most shoots:

.....

.....

.....

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## Part I

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. (*a*) In Shorthorn cattle, individuals with red coats have a genotype RR; white individuals have a genotype rr and those with a genotype Rr are roan (partly red—partly white).
What coat colour would you expect the calves in the $F_1$ generation to have as a result of the following crosses? Show by diagrams how you arrive at your answer.
(i) red bull × white cow,
(ii) white bull × white cow,
(iii) roan bull × roan cow.

(*b*) Explain three of the following: (i) phenotype, (ii) mutation, (iii) homozygous, (iv) meiosis, (v) allele.

9. (*a*) Construct a food chain which includes at least three of the following: an insect, a crustacean, an alga, a fish, a flowering plant, a bird, a mammal. Give an appropriate example of each type of organism in the food chain and state the type of ecosystem in which the food chain is found.

(*b*) Write a paragraph in each case to indicate what the consequences would be, in the ecosystem you have studied, if some mysterious disease caused the death of
(i) all the decomposers,
(ii) all the primary consumers,
(iii) all the secondary consumers.

10. (*a*) Distinguish clearly between pollination and fertilization.

(*b*) Show with the aid of labelled diagrams the structural differences between any named seed and a so-called "seed-potato".

(*c*) Where exactly does fertilization normally occur in the human? What is the relation between fertilization and menstruation. Outline briefly the change that takes place in the reproductive tract during menstruation.

11. (*a*) By means of large labelled diagrams only, describe the structure of the sporophyte generation of a named fern.

(*b*) If sexual reproduction in the fern is to be successful, then the prothallus needs to be in contact with water. Why?

12. A large potted plant was kept in darkness for about 12 hours. One hundred leaves of the plant were selected and a disc, 1 cm in diameter, was cut from the lamina on the left hand side of the midrib of each of the leaves. These discs were oven-dried and weighed. The plant was then placed in a warm sunny situation for an experimental period of several hours. At the end of this period, one hundred similar discs were cut from the laminas on the right-hand side of the midrib and were then oven-dried and weighed.
The discs removed at the end of the experimental period were considerably heavier than the discs removed at the beginning.
(i) How do you account for this?
(ii) Why was it necessary to use dried samples?
(iii) What result would you expect if the plant had been left in total darkness during the experimental period? Give reasons for your answer.

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13. A person eats fish and chips and drinks a glass of milk.

(*a*) What are the principal types of foodstuff contained in the (i) fish, (ii) chips, (iii) cooking oil, (iv) milk?

(*b*) In what form are these foodstuffs when they are finally absorbed into the blood stream and to what use does the body put them?

(*c*) Name the enzymes involved in the digestion of protein and say where they are produced.

14. Briefly explain any four of the following:

(*a*) the function of the eustachian tube,

(*b*) why the left ventricle has a more muscular wall than the right ventricle,

(*c*) how you could demonstrate the presence of starch in green leaves,

(*d*) the function of any one animal hormone,

(*e*) how you would attempt to grow *Mucor* (or *Rhizopus*).

15. If a gun is discharged in the air near a group of rabbits, they will run away. Describe the part played by (i) the nervous system, (ii) the muscles, (iii) the bones of the rabbit in bringing about this escaping behaviour.