

Write your Examination Number here

**AN ROINN OIDEACHAIS**

**LEAVING CERTIFICATE EXAMINATION, 1976**

**BIOLOGY—HIGHER LEVEL**

**FRIDAY, 18 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. Complete five of the following by entering the most suitable term in the spaces provided.

*Example:* Egg is to female as .....sperm.....is to male.

- (a) Humerus is to arm as.....is to leg.
- (b) Gut is to endoderm as.....is to mesoderm.
- (c) Carbohydrate is to glucose as.....is to albumen.
- (d) Ovule is to seed as.....is to fruit.
- (e) Iodine is to starch as.....is to reducing sugars (e.g. glucose).
- (f) Pepsin is to stomach as.....is to mouth.
- (g) Cilia are to *Paramecium* as.....are to *Chlamydomonas*.
- (h) Starch is to plants as.....is to animals.

2. Four leaves from the same plant are weighed and are treated as follows:—

- Leaf 1: coated with petroleum jelly on both surfaces;
- Leaf 2: coated with jelly on the upper surface only;
- Leaf 3: coated with jelly on the lower surface only;
- Leaf 4: is not coated.

The leaves are then weighed, left in bright airy conditions for one hour, and weighed again. State, giving your reasons:

(i) which leaf would show the largest percentage loss in weight:.....  
.....

(ii) which leaf would show the smallest percentage loss in weight:.....  
.....

Name three environmental factors that influence transpiration rate.

.....

What conditions give the highest rate of transpiration?

.....

3. In each of the groups of terms below, three have something in common which the fourth has not. Underline the "odd term" in each group. State the reason for your choice, including the relationship between the other three terms.

Example: liver fluke flea bee tapeworm

Reason: The bee is free-living. The other three are parasites.

(a) erythrocytes leucocytes alveoli platelets

Reason:.....  
.....

(b) renal artery aorta pulmonary artery hepatic artery

Reason:.....  
.....

(c) skin lung kidney liver

Reason:.....  
.....

(d) ptyalin insulin trypsin rennin

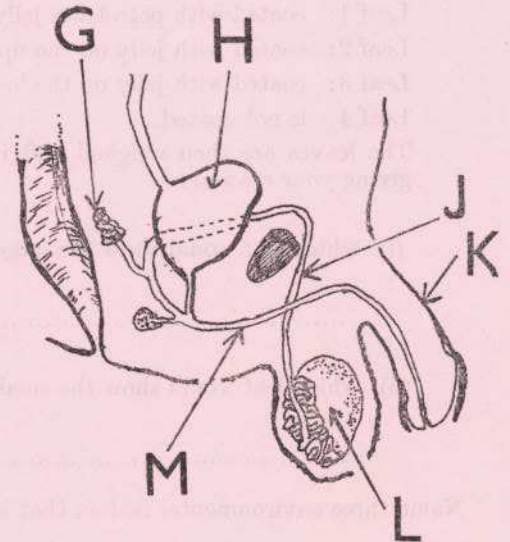
Reason:.....  
.....

(e) earthworm snail rat insect

Reason:.....  
.....

4. Name the parts labelled in the diagram of the male urinogenital system.

- G.....
- H.....
- J.....
- K.....
- L.....
- M.....



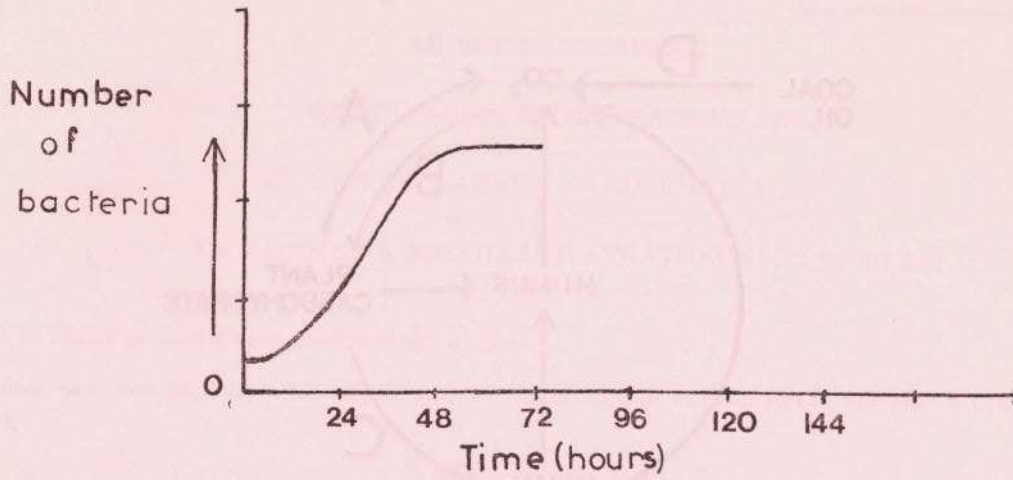
What are the two major functions of the part labelled L?

.....  
.....

What is the function of G?

.....

5. A small number of bacteria belonging to a single species were placed in a fresh sterile nutrient broth and the culture was then incubated. The graph shows how the number of bacteria in the culture increased over a period of time.



Give two reasons why increase in numbers ceases after about 48 hours.

(i) .....

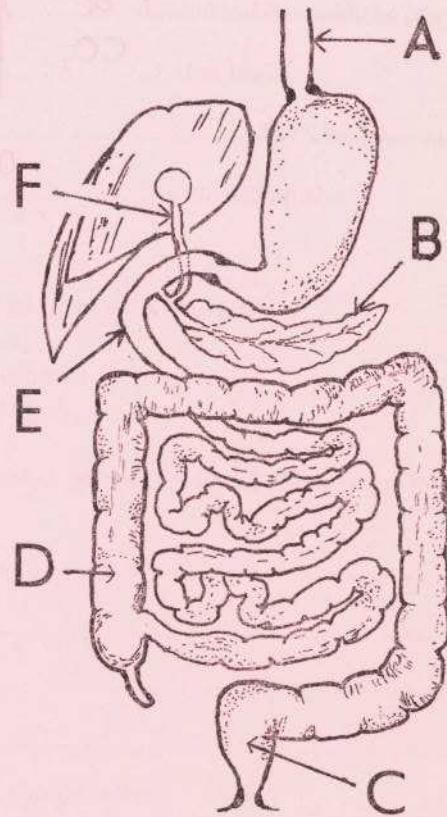
(ii) .....

Show, by extending the graph, what you think would happen the numbers of live bacteria in the culture after 72 hours.

What is meant by "sterile" in relation to the broth used in this experiment? .....

How would you make the broth sterile when preparing this experiment? .....

6. Name the parts labelled in the diagram of the human digestive system.



A.....

B.....

C.....

D.....

E.....

F.....

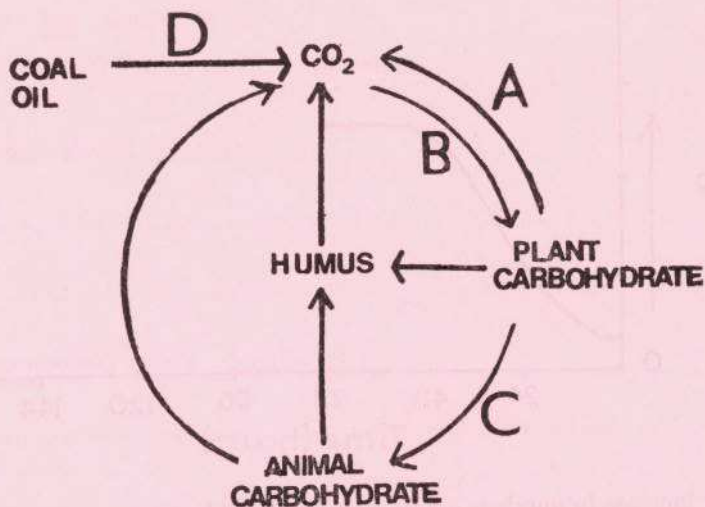
Mark X on the diagram to show the location of a sphincter muscle.

Give two functions of the part labelled B.

(i) .....

(ii) .....

7. Given below is an outline diagram of the carbon cycle. What events are represented by the letters A, B, C, D?



A.....

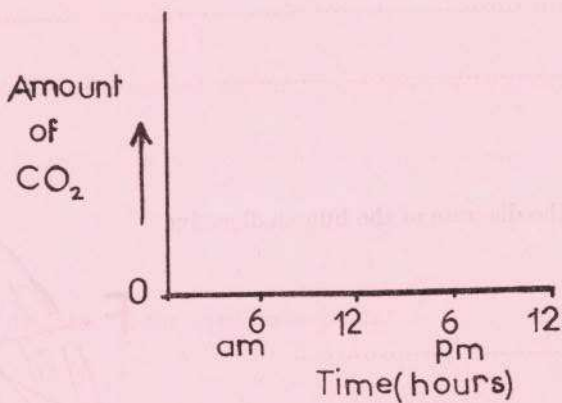
C.....

B.....

D.....

What chemical elements make up a carbohydrate?.....

Draw a rough graph, using the axes provided, to show how the atmospheric CO<sub>2</sub> level would vary just above the surface of a field of young oats over a twenty-four hour period of calm fine weather in early summer.



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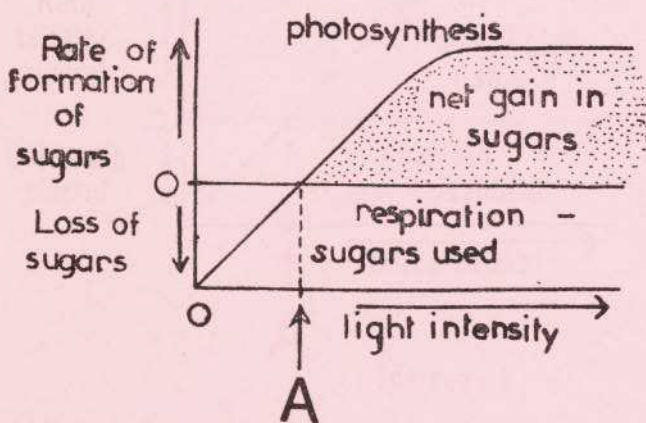
Part I is on a separate sheet which provides spaces for your answers. The completed sheet should be enclosed in your answer-book.

## PART II (280 marks)

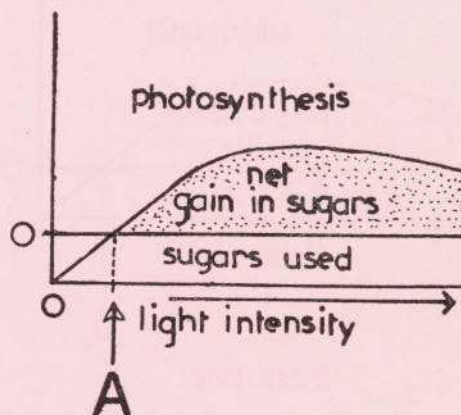
Write your answers to this part in your answer-book.

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

8. What is meant by alternation of generations? Give an illustrated account of the life cycle of a moss.  
 "The fern occupies an intermediate position between moss and flowering plant in regard to terrestrial existence." Give evidence in support of this statement by reference to three features of the structure and life cycle of the fern.
9. (a) What is epithelial tissue? Describe, using labelled diagrams, *two* examples of epithelial tissue and state where each is found in the human body.
- (b) Make a labelled drawing of a longitudinal section of a long bone, such as the femur.  
 A bone was put into dilute hydrochloric acid for a period and a similar bone was burned. Both bones retained their shape, but the bone put in the acid became very flexible and rubber-like whereas the burned bone became very brittle. Explain the results of this experiment.
10. Describe an experiment to show that carbon dioxide is necessary for photosynthesis.  
 The following graphs show the relationship between light intensity and the production and utilisation of sugars in two different species of plants. The scales used in the two graphs are the same.



SPECIES 1



SPECIES 2

What term is used to describe the level of light intensity at the points marked A? Briefly explain the meaning of this term.

State with reasons which of the species would be found in a shady habitat.

Suggest why the curve for photosynthesis levels off after a certain light intensity is reached.

11. Place the following animals in their respective Phyla giving your reasons: Rabbit, Bee, *Paramecium*.  
 Compare the external features of a free-living flatworm (Phylum Platyhelminthes) with those of an earthworm (Phylum Annelida).  
 Give a concise account of reproduction in the earthworm.

[P.T.O.]

12. (a) With the aid of diagrams, compare the results of mitosis and meiosis. (Accounts of these processes are not required.)
- (b) In *Drosophila melanogaster* red eye (*W*) is dominant to white eye (*w*). White eyed is a sex-linked character. What genotypes and phenotypes result from the following cross:  
red eyed female (heterozygous) X white eyed male ?
- (c) Describe the structure of DNA and give one difference between DNA and RNA.
13. (a) Make a labelled diagram to show the structure of a motor neuron. How does it differ from a sensory neuron?  
Describe, with the aid of a diagram, what is meant by a reflex arc and give an example of a reflex arc in man.
- (b) What is a hormone?  
Oat seeds are germinated in the dark under laboratory conditions and the seedlings are then exposed to sunlight from one side. After 24 hours the coleoptiles are seen to have grown towards the light source. Explain how this response is brought about.
14. (a) Giving examples from your field studies, explain the following terms:—(i) food chain, (ii) competition, (iii) ecological niche or food niche.
- (b) A County Council intends spraying roadside grass verges and hedgerows next Spring with a herbicide (weedkiller) designed to kill a range of monocotyledonous and dicotyledonous plants.  
Describe how you would investigate the effects of this measure on plant and animal life.
- (c) "River pollution is no threat to man."  
Give briefly three main points to refute this statement.
15. Answer two of the following.
- (a) Make a labelled diagram of the internal structure of the mammalian heart and include the blood vessels entering and leaving it. Indicate the direction of the blood flow through the heart. Comment briefly on the role of the valves.
- (b) Describe, with the aid of a labelled diagram, the structure and principal method of reproduction of *Mucor* or *Rhizopus*. Comment briefly on the mode of nutrition of the fungus.
- (c) Explain the term fossil. Show how fossil records provide evidence of organic evolution.

