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LEAVING CERTIFICATE EXAMINATION, 1981

BIOLOGY—HIGHER LEVEL

TUESDAY, 16 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*) The glomerulus is located in the.....
   (*b*) Scurvy is caused by lack of.....
   (*c*) In which cell organelle does oxidative phosphorylation take place?.....
   (*d*) A corm is a modified.....
   (*e*) What mineral is essential for blood clotting?.....
   (*f*) Trypsinogen is secreted in the.....

2. Give two ways in which each of the following differs from cheek cells.

   A nerve cell (i) .....
   (ii) .....
   A human sperm (i) .....
   (ii) .....
   A pollen grain (i) .....
   (ii) .....
   A human red blood corpuscle (i) .....
   (ii) .....

3. The graph shows the relationship between light intensity and the rate of photosynthesis at two different carbon dioxide concentrations.

(i) If you were carrying out the experiment how would you vary the light intensity?

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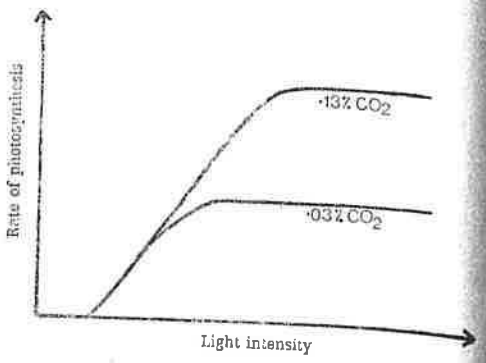

(ii) How would you measure the rate of photosynthesis?

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(iii) Why does each curve on the graph eventually form a plateau? .....

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(iv) What is meant by the term compensation point?.....

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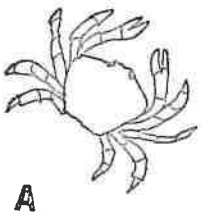
4. State the phylum to which each of the following organisms belongs and in each case give two reasons for including the organism in this phylum.



A

B

A. Phylum.....

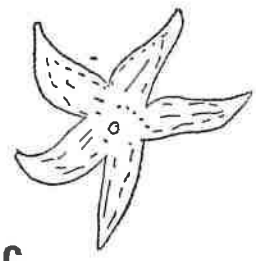
Reasons (i) .....

(ii) .....

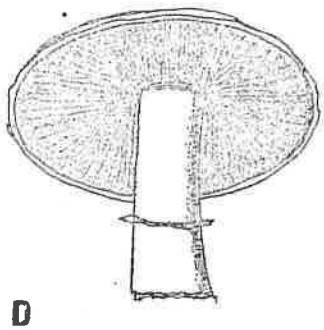
B. Phylum.....

Reasons (i) .....

(ii) .....



C



D

C. Phylum.....

Reasons (i) .....

(ii) .....

D. Phylum.....

Reasons (i) .....

(ii) .....

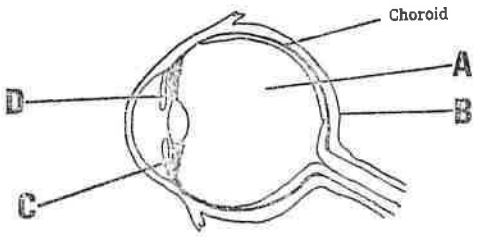
5. (i) Label the parts of the eye

A. .....

B. .....

C. .....

D. .....



(ii) What is the function of C? .....

.....

(iii) Why has the choroid layer a black or brown pigment?.....

.....

(iv) Name the two types of light sensitive cells found in the retina

(a) ..... (b) .....

Which of these cell types is active in dim light?.....

.....

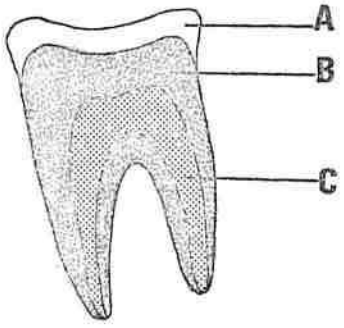
6. The diagram shows a vertical section through a human molar tooth.

(i) Name the parts of the tooth labelled A, B, C.

A. .....

B. .....

C. .....



(ii) List the constituents of a balanced diet.....

.....

.....

.....

(iii) Outline a laboratory test for a named vitamin.....

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7. Distinguish between the following pairs of terms: (Example: artery and vein. An artery carries blood from the heart, a vein carries blood to the heart.)

(*a*) plasma and serum.....

.....

.....

(*b*) excretion and egestion .....

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(*c*) voluntary and involuntary muscle.....

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(*d*) passive and active transport .....

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(*e*) parasite and saprophyte .....

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A3

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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. (i) Explain each of the following terms:
(*a*) chiasma (*b*) chromatid.
(ii) State Mendel's Second Law (Law of Independent Assortment).
What is meant by linkage in genetics and how does it affect Mendel's Second Law?
(iii) A broad leaved, red flowered snapdragon was crossed with a narrow leaved white flowered plant and all the offspring were broad leaved with pink flowers. One of these F_1 plants was then crossed with a narrow leaved white plant.
Show by means of diagrammatic crosses, the genotype and phenotype of the offspring of this cross.

9. (i) List the differences between a sensory and a motor neuron.
(ii) Outline the differences between a nervous and a hormonal response.
(iii) Give a detailed account of the changes in the hormone levels and their effects during the menstrual cycle of the human (excluding pregnancy) and show how the pituitary functions as a "master gland" in the course of this cycle.

10. (i) Give two reasons why many seeds go through a period of dormancy before germinating and explain how this dormant period might be of advantage to a seed.
(ii) The following results were obtained from a study of germination and early growth of a cereal. The grains were sown in controlled conditions. Every two days the dry weights of both endosperm and embryo were taken.

Time after sowing (days)	Total dry weight (grams)	Endosperm dry weight (grams)	Embryo dry weight (grams)
0	0·045	0·043	0·002
2	0·043	0·041	0·002
4	0·040	0·032	0·008
6	0·036	0·020	0·016
8	0·033	0·009	0·024
10	0·040	0·006	0·034

(*a*) What do you understand by the term dry weight and why is it so important in botanical experiments?
(*b*) Plot the above results on a graph with time on the horizontal axis.
(*c*) Explain the changes in the total dry weight of the seed.
(*d*) Comment with reasons on the relationship between the dryweight of the endosperm and the dry weight of the embryo.

11. (i) The earthworm is a triploblastic, coelomate animal. Define each of the underlined terms and explain its significance.
(ii) Describe, using diagrams, how reproduction takes place in the earthworm.
(iii) Give an account of the importance of earthworms
(*a*) as members of a food chain and
(*b*) in relation to soil structure and fertility.

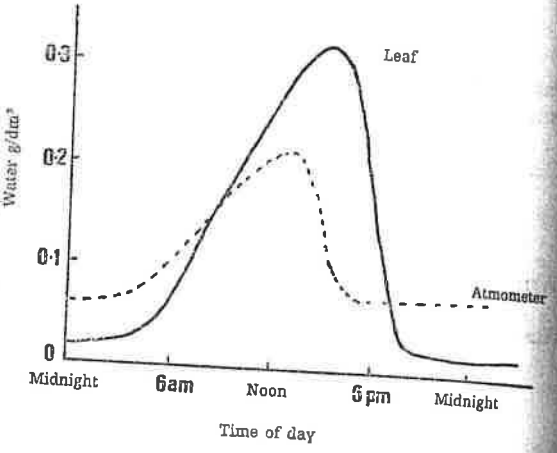
12. (i) Outline the main points of Darwin's Theory of Evolution by natural selection.
(ii) Show, with the aid of diagrams, how the reproduction and life cycle of (*a*) Spirogyra (*b*) moss *or* fern and (*c*) the flowering plant provide evidence for evolution in the Plant Kingdom.

13. (i) Explain the terms (*a*) transpiration and (*b*) guttation.
(ii) An experiment to compare the water lost by transpiration from a leaf, with that lost from an atmometer by evaporation, was carried out. The results obtained are plotted on the graph below

(*a*) What external conditions should be kept constant during the experiment?

(*b*) Sketch the apparatus used in carrying out the experiment.

(*c*) Suggest a hypothesis to explain the results as fully as possible.



14. (i) Distinguish between mesophyte, hydrophyte and xerophyte. Give a named example of each type.
(ii) With reference to the survey you carried out as part of your field studies describe (using diagrams where necessary) your methods and any special apparatus used
(*a*) to collect and identify the organisms present—both plant and animal,
(*b*) to discover and record the frequency of these organisms,
(*c*) to note factors affecting the distribution of the organisms.

15. Answer *two* of the following
(*a*) Write an essay on the principles and methods of food preservation.
(*b*) Describe an experiment to show that carbon dioxide is produced as a result of respiration in woodlice.
(*c*) (i) List the components of a fertile soil.
(ii) Describe an experiment to find the air content of soil.
(*d*) Describe how lymph and the lymphatic system
(i) form an important part of the circulatory system and
(ii) act as a defence mechanism of the body against disease.