

WARNING: You must return this section with your answer book otherwise marks will be lost.

Write Your
Examination
Number here

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AN ROINN OIDEACHAIS

18418

LEAVING CERTIFICATE EXAMINATION, 1993

BIOLOGY — ORDINARY LEVEL

WEDNESDAY, 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.

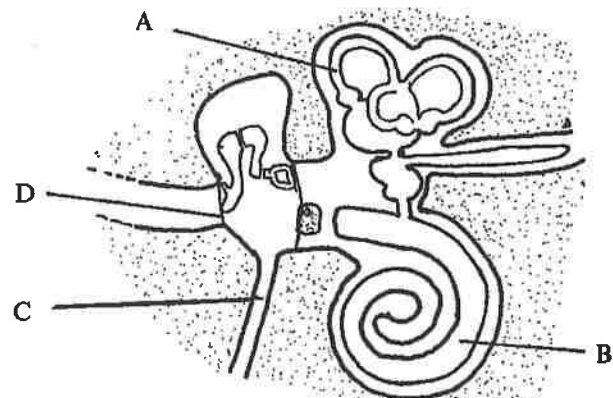
Be sure to return this part of the examination paper; enclose it in the answer book you use for answering Part II.

1. Answer *four* of the following:

- (a) The end product of starch digestion is
- (b) Scurvy is caused by the lack of vitamin
- (c) An onion is a modified
- (d) The growth response of a plant to light is called
- (e) The crop in the earthworm is used for

2. Name the parts labelled on the diagram of the ear.

- A
- B
- C
- D



What would be the effect if A were damaged?

.....

What would be the effect if B were damaged?

.....

3. Name the organism shown in the diagram.

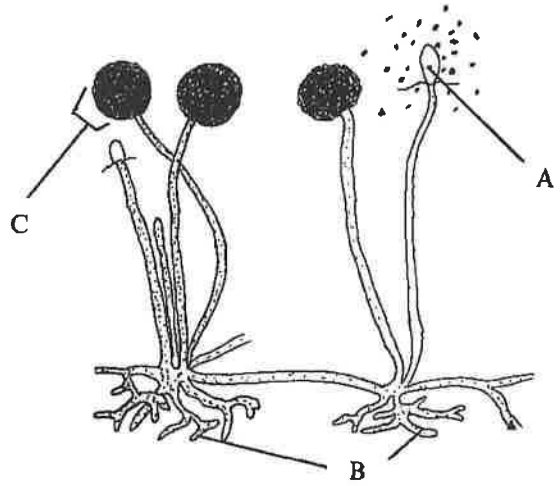
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Name the parts labelled A, B, C.

A

B

C



State a function of each of the parts B and C.

B

C

Name a common human disease caused by a fungus.

.....

4. Match each of the parts labelled on the outline diagram of the microscope with one function listed below.

Function

Label Letter

Contains objective lens;

Magnifies the image produced by the objective lens;

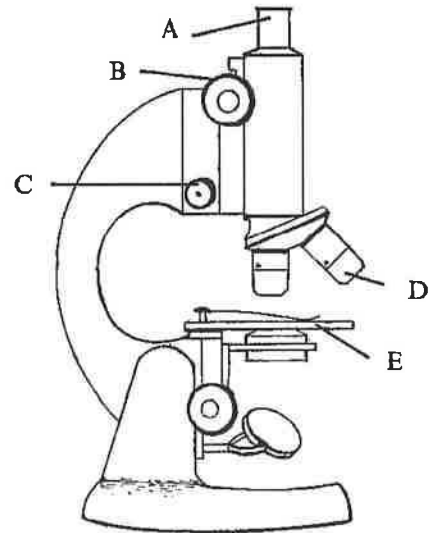
Moves the barrel for coarse focusing of the specimen being viewed;

Contains an opening to allow light pass through the specimen;

Brings specimen slowly into fine focus.

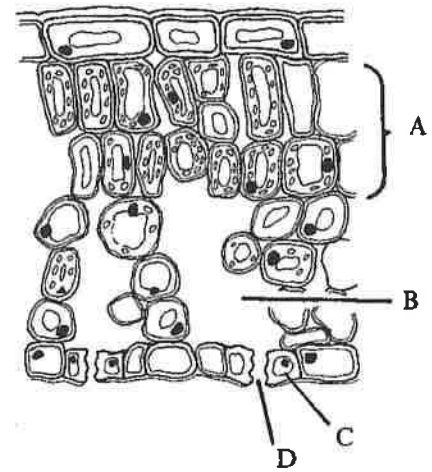
What is the purpose of the iris diaphragm?
.....

When viewing through an eyepiece marked $\times 10$ and an objective lens marked $\times 40$ what is the actual magnification?
.....



5. Name the parts labelled on the diagram of the leaf.

- A
- B
- C
- D



What is the function of A?

.....

What is the function of C?

.....

6. 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 balloon B inflate more than balloon A?

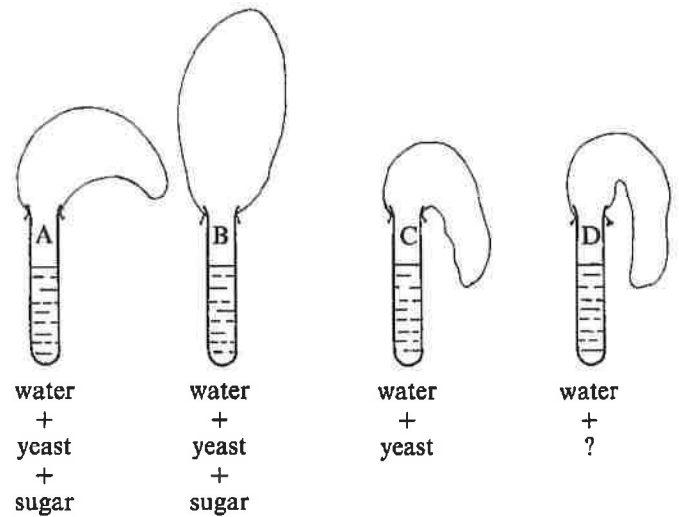
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Test-tubes C and D are controls in this experiment. Why is there no inflation in the case of balloon C?

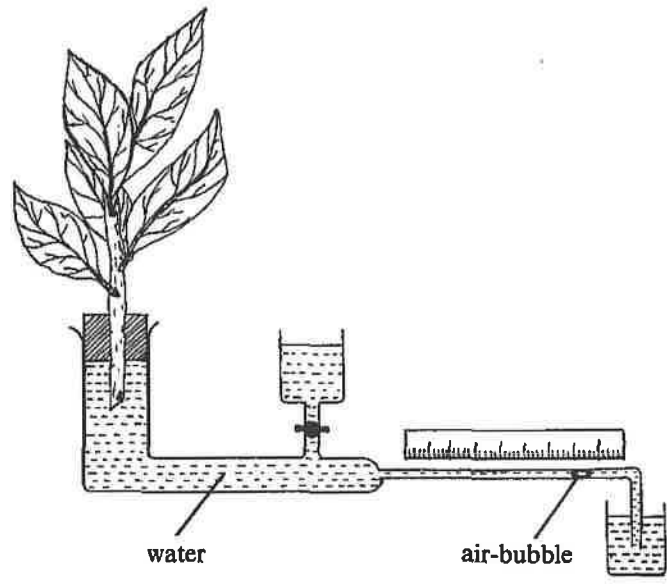
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What substance together with water would you put into test-tube D?

.....



7. (i) Name the apparatus shown in the diagram.....



(ii) What is the function of the apparatus?

.....

(iii) State a precaution you would take when preparing the leafy shoot for placing in the apparatus?

.....

(iv) State what you would expect to observe with regard to the movement (if any) of the air-bubble in the capillary tube:

(a) in windy conditions

(b) in humid conditions

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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)

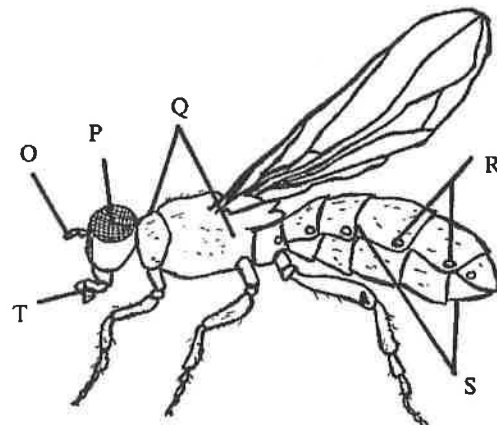
Write your answers to this part in your answer book.

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

8. (i) Draw a large labelled diagram to show the structure of a cell from a filament of *Spirogyra*. (28)
- (ii) Describe how *Spirogyra* reproduces (a) asexually, (b) sexually. (27)
- (iii) How does an *Amoeba* cell differ from a *Spirogyra* cell? (15)

9. (a) (i) Name the phylum to which insects belong and give two main characteristics of this phylum.

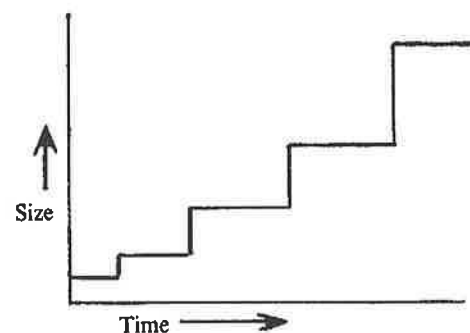
- (ii) Name the parts labelled on the diagram of an insect. State one function of each of the parts labelled O and R. (34)



- (b) (i) Insects can show either complete metamorphosis or incomplete metamorphosis in their life cycles. Explain the underlined terms and describe, with the aid of labelled diagrams, the life cycle of an insect showing complete metamorphosis.

- (ii) The graph shows the growth of a particular insect species. Explain why the graph takes this shape.

Name another group of animals which shows this growth pattern. (36)



10. (a) Name three pigments present in a chloroplast.

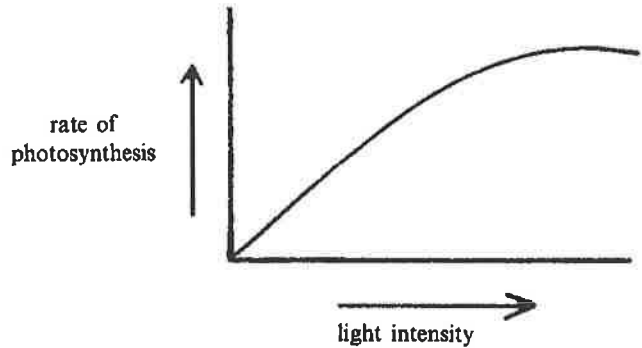
In the laboratory a student was given a chloroplast extract, chromatography paper, a dropper, a test-tube, a bung and a solvent.

- (i) Describe an experiment the student could carry out, using the above apparatus, to demonstrate the presence of pigments in chloroplasts.
- (ii) Draw a diagram of the apparatus set up for the experiment. Label the various items in the test-tube.
- (iii) State what the student would observe at the end of the experiment. (41)

(b) Give a balanced chemical equation to summarise the process of photosynthesis.

The graph shows how light intensity affects the rate of photosynthesis.

- (i) At a certain level of light intensity the compensation point is reached. Explain the term compensation point.
- (ii) State why the curve for photosynthesis eventually levels off.



One of the end products of photosynthesis is a simple carbohydrate. State any two uses to which the plant puts this carbohydrate. (29)

11. (i) Explain the following terms as used in genetics:

(a) dominant, (b) locus, (c) multiple alleles. (18)

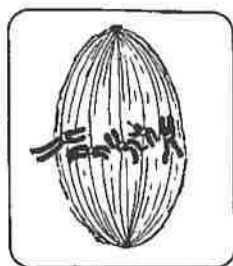
(ii) A man with blood group A marries a woman with blood group AB. Show by means of diagrams

- (a) the possible genotypes of the man;
- (b) the genotype of the woman;
- (c) the genotypes of the gametes *each* produces;
- (d) the possible genotypes and phenotypes of their children. (28)

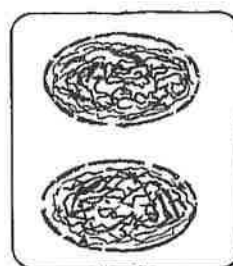
(iii) The diagrams A and B show two phases of mitosis.

Name the phases shown.

Draw and label the other two phases of mitosis. (24)



A



B

12. (a) (i) Physical weathering and chemical weathering play a very important part in the process of soil formation.

Explain the underlined terms.

(ii) Among the properties of soil are the following: porosity, pH, capillarity.

Explain each of those terms.

Describe an experiment to compare *either* the porosity *or* the capillarity of two soil samples. (42)

(b) Explain the term biosphere.

A quadrat is used to estimate the number of earthworms in a lawn, and a Tullgren funnel (or Baermann funnel) is used to find out if there are tiny organisms in the soil.

Describe how (i) the quadrat, (ii) the Tullgren (or Baermann) funnel, is used. (28)

13. (a) Name the three basic bacterial shapes.

Describe an experiment to show the presence of bacteria in air.

Most bacteria obtain their nutrition by heterotrophic means. Name two types of heterotrophic nutrition. (40)

(b) Explain what is meant by food preservation and state why it is necessary.

Give a scientific basis for each of *three* of the following methods of preserving food:

(i) canning, (ii) freezing, (iii) drying, (iv) pickling. (30)

14. (a) (i) Name three parts of the human skeleton that have a major protective function, and, in each case, state what is protected.

State the part played by the skeleton in the formation of blood cells.

(ii) In an experiment, a bone, after being immersed for some time in a dilute hydrochloric acid solution, was found to be flexible and rubbery. Suggest a reason for this. (33)

(b) Draw and label a transverse section through a young dicotyledonous stem as seen before the start of secondary thickening.

How does the section you have drawn differ from a section through a young dicotyledonous root?

Give two functions for *each* of the following: (i) a stem, and (ii) a root. (37)

15. Answer two of the following.

(35, 35)

(a) What is an enzyme?

Describe an experiment to show that the rate of enzyme action is affected by temperature.

(b) What are the end-products of the complete digestion of a protein molecule?

Outline the pathway taken by the products of protein digestion from the time they enter the bloodstream from the intestine until they reach a muscle in the leg.

(c) Draw a diagram of the male human reproductive system and label the following parts: scrotum, penis, sperm duct (vas deferens), seminal vesicle, urethra, testis.

State two functions of the testis.

(d) The diagram illustrates a carpel from a flower before fertilization.

(i) Name the parts A, B, C, D.

What is the function of the stigma?

Is D haploid or diploid?

(ii) Before fertilization can occur a structure must enter through A.

Name this structure.

What will pass from this structure into the embryo sac?

State what happens next to complete the process of fertilization.

