

Write your
Examination
Number here

AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1985

BIOLOGY—HIGHER LEVEL

TUESDAY, 18 JUNE—MORNING, 9.30 to 12.30

No. 32978

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 the following, by placing the correct answer (a), (b), (c) or (d) in the space provided.
- (i) Which of the following statements, referring to the dark phase of photosynthesis, is true?
- (a) CO_2 is released.
(b) Light energy is absorbed.
(c) NADPH_2 is formed.
(d) CO_2 is required.
- (ii) The mineral content of bone tissue can be removed by
- (a) burning the bone.
(b) placing the bone in dilute acid.
(c) heating the bone to 100°C .
(d) placing the bone in alcohol.
- (iii) A lichen is best described as a symbiotic union between
- (a) a bacterium and a fungus.
(b) a virus and an alga.
(c) a fungus and an alga.
(d) a virus and a bacterium.
- (iv) Two substances necessary for the clotting of blood are
- (a) vitamin E and magnesium ions.
(b) vitamin E and calcium ions.
(c) vitamin K and magnesium ions.
(d) vitamin K and calcium ions.
- (v) Two conditions necessary for the germination of seeds are
- (a) heat and light.
(b) oxygen and light.
(c) heat and oxygen.
(d) light and water.

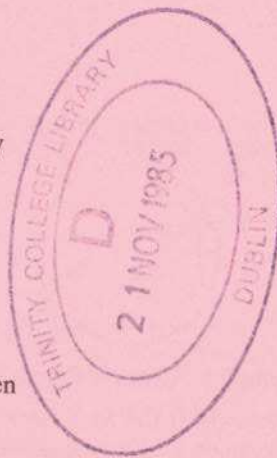
Answer

Answer

Answer

Answer

Answer



2. Explain the term guttation.

.....

The graph shows the water lost during an experiment (a) from a leaf by transpiration and (b) from an atmometer.

What is the name of the process of water loss from an atmometer?

In the experiment both humidity and air movement were kept constant.

(i) Why is there less water lost from the leaf than from the atmometer at midnight?

.....

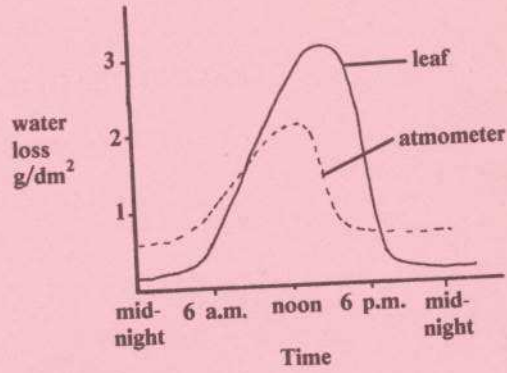
.....

(ii) Why is there more transpiration at noon than at 6 p.m.?

.....

(iii) Name the apparatus used to measure transpiration

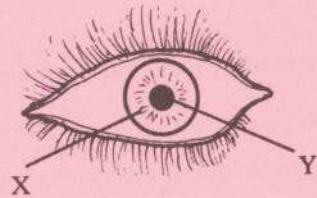
.....



3. The diagram shows the front view of a human eye. Name the parts labelled X and Y.

X

Y

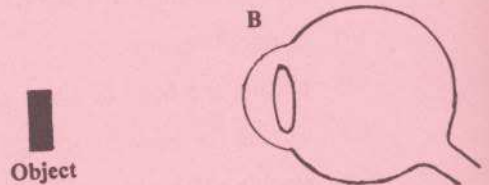
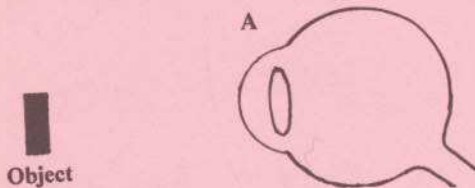


Is the eye shown adapted to bright light or to darkness? Give a reason for your answer.

Adapted for

Reason

Diagrams A and B both represent an eye that is long-sighted.



(i) Draw in on diagram A the light rays from a near object to show where a clear image would be formed.

(ii) Draw in on diagram B the light rays, together with an additional lens, to show how this defect may be corrected to produce a clear image on the retina.

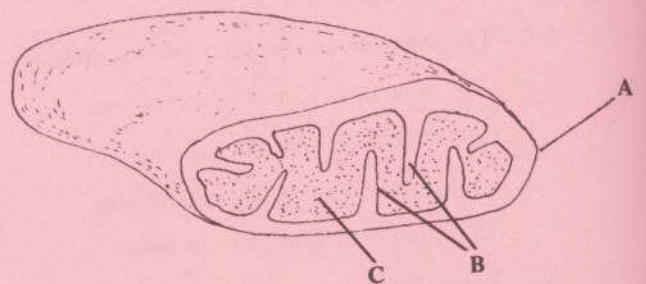
(iii) Name the type of lens that is used to correct long sight.

4. Name the cell organelle shown in section in the diagram. Name the parts labelled A, B, C.

A

B

C



In what major cellular process does this organelle take part? Name the stage of the process which occurs

(i) at B?

(ii) in C?

Give a balanced chemical equation for this process.

.....

5. The rat is classified as Phylum Chordata, Class Mammalia. Give two characteristics that enable the rat to be classified as a mammal.

(i)

(ii)

Name an organism from the Phylum Echinodermata and give two *external* features that enabled you to place it in this Phylum.

Name

Features (i)

(ii)

Name the organism shown in the diagram.

.....

Give two features that enabled you to identify it.

Features (i)

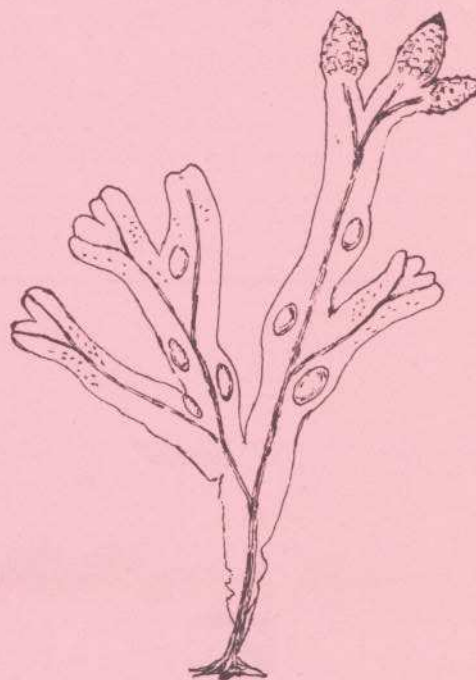
.....

(ii)

.....

Give one adaptation of the organism to its environment that can be seen in the diagram.

.....



6. In an experiment to investigate the growth of bacteria five nutrient agar plates were treated as shown in the table and the results observed after 48 hours were recorded.

Plate	Treatment	Placed in a	Observation
A	Left unopened	Warm incubator	Plate clear
B	Left open in the laboratory for 5 minutes	Warm incubator	A few colonies visible
C	Left open in the laboratory for 5 minutes	Refrigerator	Plate clear
D	Left open in the dining hall during lunch time for 5 minutes	Warm incubator	A lot of colonies visible
E	Surface of the agar covered with vinegar and then exposed as for D	Warm incubator	Plate clear

(i) What does the term sterile mean with reference to nutrient agar plates?

.....

(ii) Why was plate A left unopened?

(iii) What was the effect of the lower temperature on plate C?

.....

(iv) Explain why vinegar prevented bacteria growing on plate E

.....

(v) Name the method of food preservation shown by each of the plates C and E.

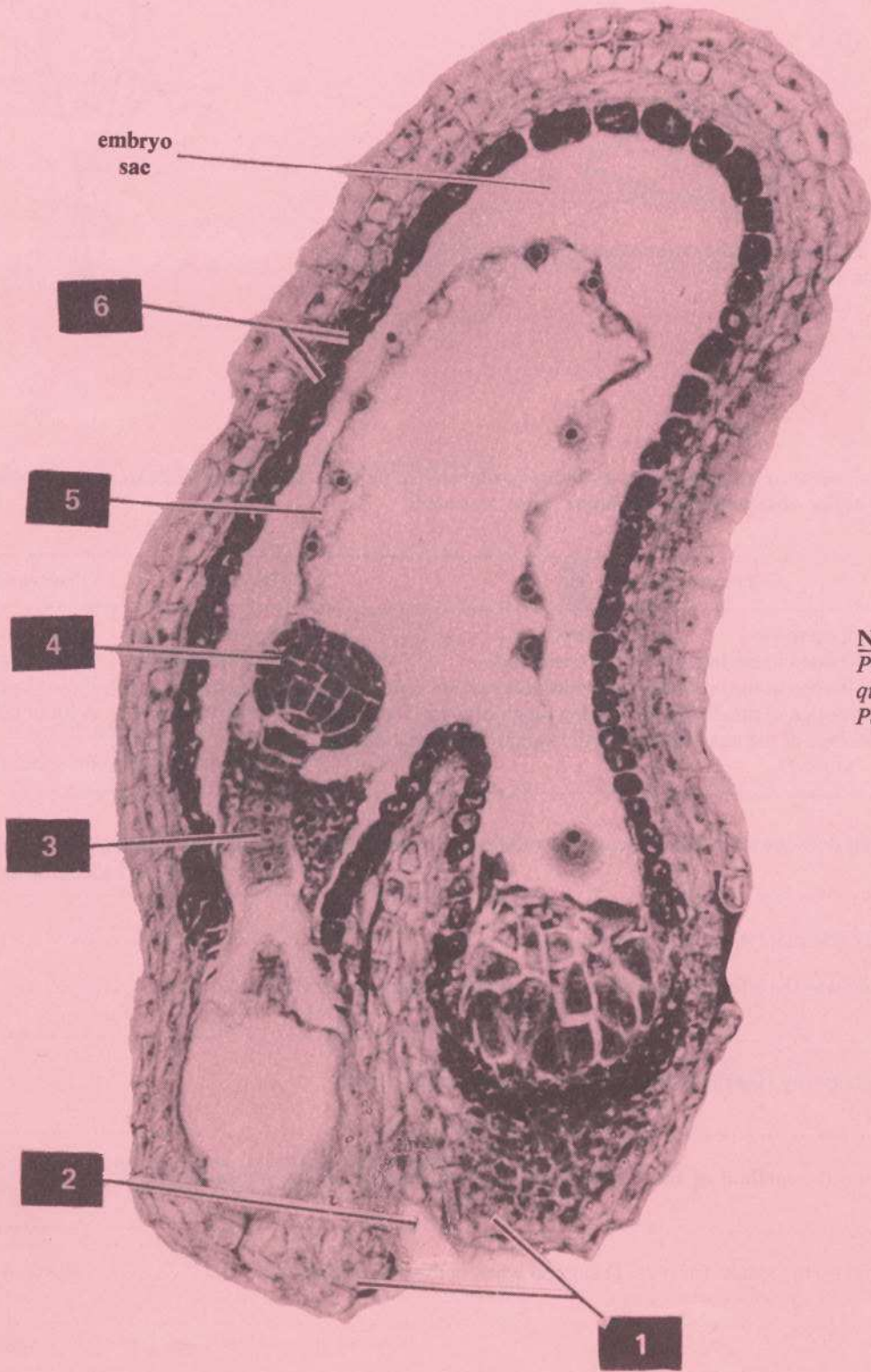
C E

(vi) What do the results for plate D suggest when compared to plate B?

.....

7. For each of the following, distinguish between the members of the pairs of terms by writing a brief explanatory note on each term.

- (i) isogamy and heterogamy
 -
 -
 - (ii) rods and cones
 -
 -
 - (iii) perennation and vegetative propagation
 -
 -
 - (iv) motor neuron and sensory neuron
 -
 -
 - (v) self-pollination and cross-pollination
 -
 -
-



Note
Photograph for
question 13(c),
Part II

AN ROINN OIDEACHAIS
LEAVING CERTIFICATE EXAMINATION, 1985
BIOLOGY—HIGHER LEVEL

TUESDAY, 18 JUNE—MORNING, 9.30 to 12.30

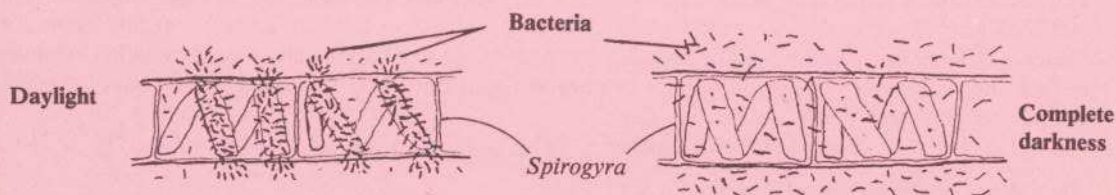
Part I is on a separate sheet which provides spaces for your answers. The completed sheet should be enclosed in your answer-book.

PART II (280 marks)

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

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

8. *Fasciola hepatica* (liver fluke) and *Phytophthora infestans* (the causative organism in potato blight disease) are parasites.
- Give the meaning of the term parasite.
 - In regard to *Fasciola* state (i) the phylum to which it belongs; (ii) the stages in the life cycle, in the order in which they are produced, starting with the egg; (iii) two aspects of the life cycle which are adaptations to the parasitic mode of life.
 - In regard to *Phytophthora* state (i) the group of organisms to which it belongs; (ii) how it survives the winter; (iii) how it gets from its overwintering stage to where it produces its first crop of sporangia; (iv) the weather conditions necessary for the infection of a new host plant.
 - Explain briefly, in terms of the life cycles, why *each* of the following practices are part of the measures used to control the parasites. (i) Land drainage in the control of *Fasciola*. (ii) Banking the soil up around the potato plant stalks during the growing season in the control of *Phytophthora*.
9. (a) Draw the laboratory apparatus you would set up for use in an experiment to show that the rate of photosynthesis varies with temperature. For this experiment state how you would
- provide variation in temperature; (ii) ensure carbon dioxide concentration does not vary during the test period; (iii) ensure light intensity does not vary during the test period; (iv) measure the rate of photosynthesis.
- (b) The diagrams show the results of experiments on photosynthesis using *Spirogyra* and motile aerobic bacteria.



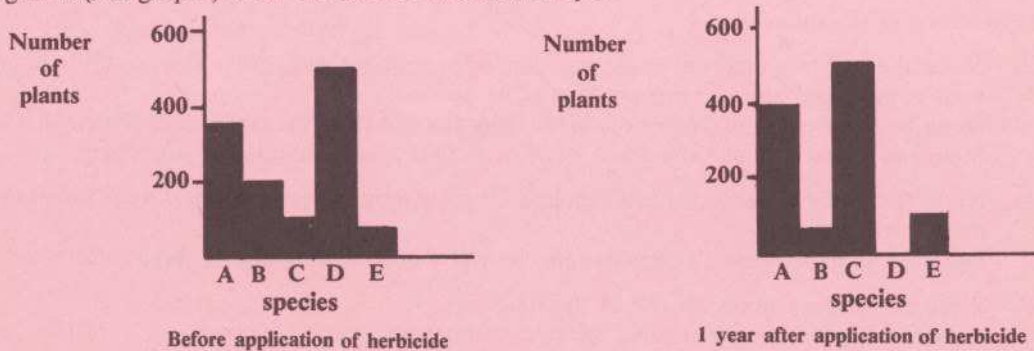
Suggest an explanation for the difference in positions of the bacteria under the two different conditions of lighting.

Draw similar diagrams to show the results you would expect if the experiment was carried out (i) in red light, (ii) in green light. Explain these results.

10. Describe in detail the method you used to investigate the distribution of a named plant species in the ecosystem you have studied. Outline the results you obtained and suggest an explanation for these results.

In an experiment to study the effect of a herbicide on plants the number of plants present was determined for each of the five plant species A, B, C, D, E, growing on the plot of land used for the study. One year later a further count was made of the plants growing on the plot.

The histograms (bar graphs) show the results of both surveys.



Compare the two survey results and suggest possible explanations.

11. (a) Describe, with the aid of four diagrams, the process of prophase I of meiosis.

(b) In genetic terms explain linkage, sex-linkage.

In man red-green colour blindness is a sex-linked character. A colour blind man and his wife have two sons. One of the sons is colour blind and the other is not. What is the genotype of the mother? Outline your reasoning.

If a future child of this couple is female, state, giving your reasoning, which of the following is the chance that she will be colour blind?

100% 75% 50% 25% 0%

12. (i) Draw a large outline diagram of a vertical section through human skin. Label the following parts on the diagram: hair follicle, sweat gland, sweat pore, erector muscle, nerve cells, sebaceous gland, capillaries, fat storage cells (adipose tissue).
- (ii) Give the meaning of the terms natural immunity, acquired immunity. State briefly the part played by the skin in the immune system of the body. Outline five other methods of providing immunity, stating in each case whether natural or acquired immunity is involved.
- (iii) In recent times there has been comment in the media regarding the use of antibiotics in agriculture with particular reference to antibiotic residues present in milk produced for human consumption. Explain briefly why there is concern among medical doctors about this.

13. Answer (a) and either (b) or (c).

- (a) Make an outline diagram of a section through either (i) a mature ovary, or (ii) a mature testis, of a mammal as seen using the microscope. Label four major parts on your diagram.
- (b) Outline the paths taken by the human male and female gametes so that fertilisation may take place.
- (c) [See photograph after question 7 in Part I]
The photograph shows a stage in the development of the embryo of shepherd's purse (*Capsella bursa-pastoris*).
Make an outline diagram of the photograph and name the parts numbered 1-6.
Indicate on the diagram a part that is diploid (2n) and a part that is triploid (3n).
What is a cotyledon? From what numbered part do the cotyledons arise?

14. Read this extract and answer the questions below.

There are an estimated 1,000,000 acres of "grouse moors", i.e. land where grouse could, should or do exist, in Ireland.

The key to what makes this or any land suitable for grouse is the presence of ling heather, the staple diet of this bird. This heather in turn grows only on drier ground, which more or less restricts it to the eastern part of Ireland.

The importance of ling heather cannot be over-emphasised, as in wild conditions young grouse will be eating mainly plant material at 10 days, and on an entirely adult diet at the age of three weeks. The principal factor in the failure to date to restock grouse moors in the same way as pheasant coverts can be restocked is the difficulty in replacing the natural diet or in supplanting an "unnatural" diet and in introducing young stock to the wild.

So far as their diet is concerned therefore, they require mainly young heather (highest protein value), usually third year growth. They will also consume slightly older heather, say fourth or fifth year growth, for its cellulose content. Finally, they require the oldest heather, in the fifth to tenth year of growth, for nesting and shelter.

The second most important factor in grouse management and consequently on their long-term survival, is the fact that grouse are highly territorial birds. The cock will select an area as his own and defend it against all comers, with the hen joining him for breeding purposes. The hen will usually nest once in her relatively short life. In fact, the vast majority of birds will not live beyond their third year; on average, two out of every three will die in their second year if not before.

(Adapted from: Curlew (1983) 'Grouse', Field and Countryside, Vol 1, No. 5, Dublin.)

- (i) What is the length of a grouse's life?
- (ii) Suggest four environmental factors that might affect the total number of grouse in an area.
- (iii) Suggest briefly, referring to ling heather only, how an area of land (suitable for grouse) with few grouse on it, might be improved so that more grouse might live there.
- (iv) Suggest one reason why it is difficult to restock land with young grouse.
- (v) What is meant by territory in relation to grouse?
- (vi) In an attempt to obtain an estimate of the total number of grouse in an area 100 grouse were captured and had rings put on their legs and were then released back into the area. After a few days another 100 grouse were captured of which 25 had rings.
Calculate the approximate number of grouse in the area.

15. Answer two of the following.

- (a) Name the enzymes involved in the digestion of protein in the digestive system of the human. State where each is produced and the end product of its action.
Describe a test you would carry out in the laboratory to show the presence of protein in a sample of food.
State two ways in which the small intestine is particularly adapted to absorbing food.
- (b) Name five major mineral elements required for growth by flowering plants. Give a function for any three of them in the plant.
Describe an experiment to demonstrate the effect of a lack of one of these minerals.
- (c) Write explanatory notes on five of the following:
thrombin, guanine, acetylcholine, spiracle, compensation point, ribosome.
- (d) Draw a labelled diagram of a parenchyma cell as seen using the light microscope.
Show with the aid of diagrams how the following cells differ from parenchyma: collenchyma, xylem, phloem.