

Write your Examination Number here 

# Coimisiún na Scrúduithe Stáit State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2006

## BIOLOGY - ORDINARY LEVEL

TUESDAY, 13 JUNE - AFTERNOON, 2.00 to 5.00

**Section A.** Answer any **five** questions from this section.  
Each question carries 20 marks.  
Write your answers in the spaces provided on **this examination paper**.

**Section B** Answer any **two** questions from this section.  
Each question carries 30 marks.  
Write your answers in the spaces provided on **this examination paper**.

**Section C** Answer any **four** questions from this section.  
Each question carries 60 marks.  
Write your answers in the **answer book**.

**It is recommended that you should spend not more than 30 minutes on Section A and 30 minutes on Section B, leaving 120 minutes for Section C.**

**You must return this examination paper with your answer book at the end of the examination.**

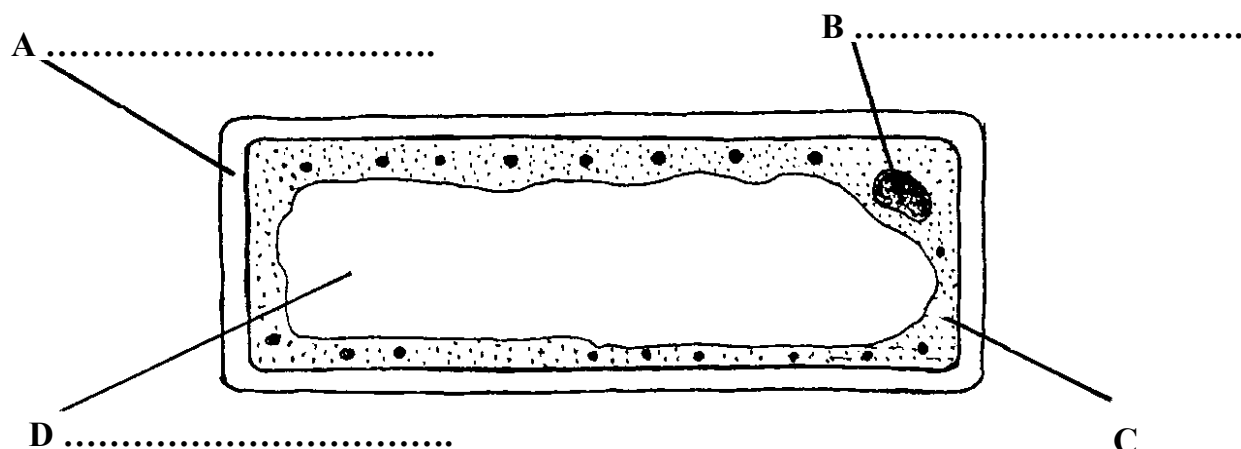
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**Section A**  
**Answer any five questions.**  
**Write your answers in the spaces provided.**

1. Use your knowledge of ecology to answer **four** parts of the following.

- (a) An organism which makes its own food is called a(n) .....
- (b) An organism that eats another organism is called a .....
- (c) The place where an organism lives is called its .....
- (d) The primary source of energy in an ecosystem is the .....
- (e) The parts of the earth and atmosphere in which life is found is called the .....

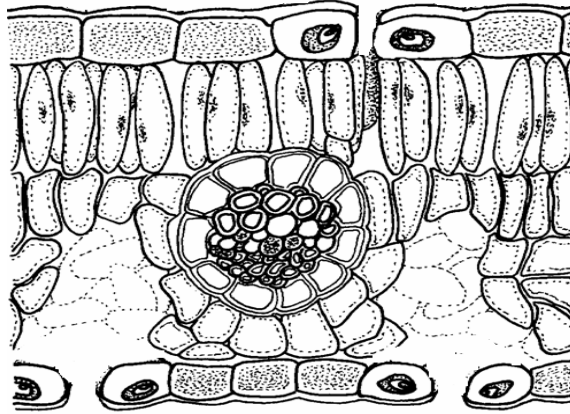
2. The diagram shows a plant cell.



- (a) Label A, B, C and D. ....
- (b) Name **two** features shown in the diagram which are not normally associated with an animal cell.
  - 1. ....
  - 2. ....
- (c) What is usually found in D? .....
- (d) Name a carbohydrate found in A. ....

3. (a) Name the **four** elements that are always present in protein. ....
- (b) Name **one** other element that may be present in protein. ....
- (c) Give **two** good sources of protein in the human diet. ....
- (d) Name a test or the solution(s) that is (are) used to detect protein in a food source. ....
- (e) State the following in relation to (d).
- 1. The initial colour of the solution(s) .....
  - 2. The final colour if protein is present .....

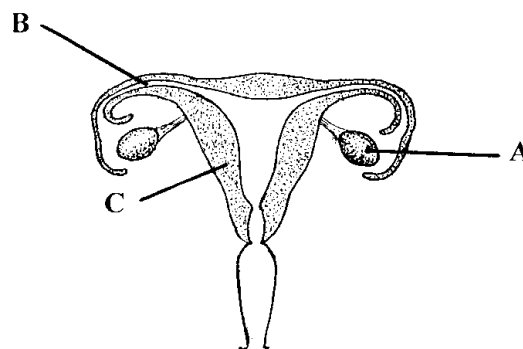
4. The diagram shows part of a section through a leaf.



[Adapted from Livingstone © BIODIDAC]

- (a) Use the letter **A** to show a point of entry of carbon dioxide.  
Name this point .....
- (b) Name a gas that **leaves** the leaf at this point .....
- (c) Use the letter **B** to show the part of the leaf in which most photosynthesis occurs.
- (d) Name the structures in plant cells in which photosynthesis occurs. ....
- (e) In addition to carbon dioxide another small molecule is needed for photosynthesis.  
Name this other molecule.....

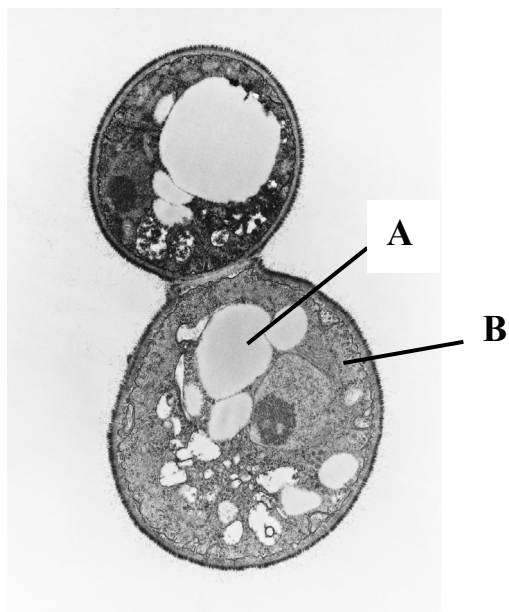
5. The diagram shows the reproductive system of a human female.



- (a) Name      A .....  
                 B .....  
                 C .....
- (b) In which of the parts A, B or C is the ovum (egg) formed? .....
- (c) What is meant by fertilization? .....  
.....
- (d) In which of the parts A, B or C does fertilization occur? .....
- (e) Give one cause of female infertility. ....  
.....

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6. The diagram shows a yeast cell, which is undergoing asexual reproduction.



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- (a) Name A and B.

A ..... B .....

- (b) What type of asexual reproduction is shown in the diagram? .....

.....

- (c) Which type of division, mitosis or meiosis, is involved in this form of reproduction?

.....

- (d) If yeast cells are kept under anaerobic conditions, alcohol (ethanol) and another substance are produced.

- (i) What are anaerobic conditions? .....

.....

- (ii) Name the other substance produced. ....

## Section B

Answer any two questions.

Write your answers in the spaces provided.

Part (a) carries 6 marks and part (b) carries 24 marks in each question in this section.

7. (a) (i) Name the chamber of the heart that receives blood back from the lungs.  
.....
- (ii) Name the blood vessels that bring this blood back from the lungs.  
.....
- (b) Answer the following in relation to the dissection of a heart.
- (i) What instrument did you use for the dissection? .....
- (ii) Describe how you carried out the dissection. ....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....
- (iii) Draw a diagram of the dissected heart and on it label the following:  
bicuspid valve, left ventricle, right atrium, tricuspid valve.

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8. (a) (i) What is meant in ecology by a **quantitative** survey? .....
- .....
- .....
- (ii) What is a quadrat frame? .....
- .....
- (b) (i) In the case of a **named** plant describe how you would carry out a quantitative survey in the ecosystem that you have studied. ....
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- (ii) Describe how you recorded the results of your survey. ....
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- (iii) Suggest a possible source of error in your study. ....
- .....
- .....
- .....
- .....

- [illegible]

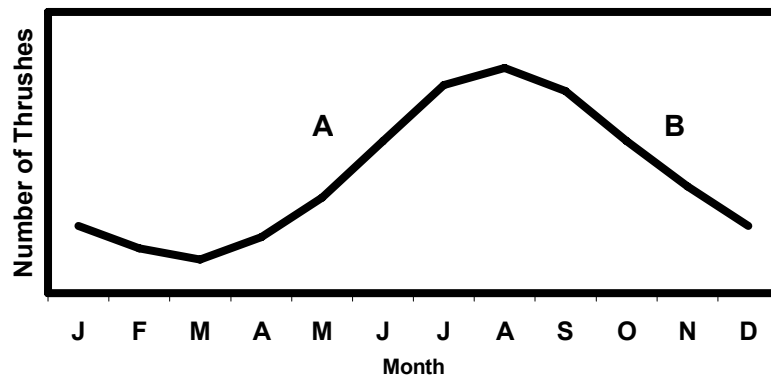
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## Section C

Answer any four questions.

Write your answers in the answer book.

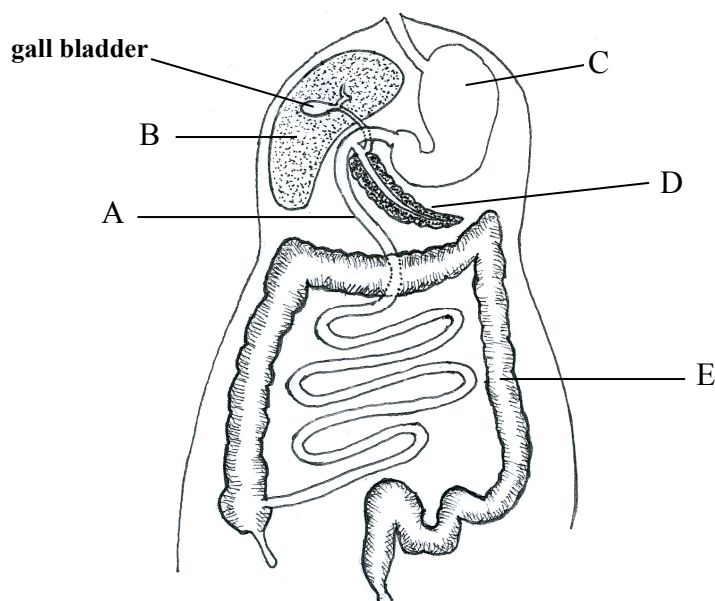
10. (a) (i) What is a pyramid of numbers?  
 (ii) Using organisms from the ecosystem that you have investigated draw a pyramid of numbers to show at least **three** trophic (feeding) levels. (9)
- (b) Study the graph, which shows how the number of thrushes in a wood changes in the course of a year, and then answer the following questions.



- (i) What does the graph tell you about the number of thrushes?  
 (ii) Suggest **one** reason for the change in the number of thrushes at A.  
 (iii) Suggest **two** reasons for the change in the number of thrushes at B.  
 (iv) Would you expect similar changes in numbers for other small birds in the wood? Explain your answer. (27)
- (c) Answer the following in relation to waste management in Ireland.  
 (i) Waste management is becoming an increasingly difficult matter. Suggest **two** reasons for this.  
 (ii) Describe **one** method of waste management by reference to agriculture, fisheries or forestry.  
 (iii) Suggest some ways of minimizing waste. (24)
11. (a) Explain the following terms, which are used in genetics: allele, homozygous, genotype. (9)
- (b) (i) Name or draw the sex chromosomes that are present in a human body cell in the case of:  
 1. A male,  
 2. A female.  
 (ii) Use a Punnet square to show that there is a fifty percent chance that fertilization will lead to a male and fifty percent chance that it will lead to a female. (27)
- (c) (i) What is genetic engineering?  
 (ii) Give **one** example of genetic engineering involving an animal and **one** example involving a plant. (24)



12. (a) (i) Write the dental formula for an adult human.  
(ii) Give a function of any **one** of the teeth indicated in the dental formula. (9)
- (b) The diagram shows the human digestive system.



- (i) Identify A, B, C, D and E in the diagram.  
(ii) What is an amylase? Name a site of amylase action. What is the approximate pH value at this site?  
(iii) Give **one** function of symbiotic bacteria in the human digestive system.  
(iv) State a benefit of dietary fibre. (27)
- (c) (i) What is meant by absorption?  
(ii) Where in the digestive system are the products of digestion absorbed? State **one** way in which this part of the system is adapted for absorption.  
(iii) Name the blood vessel that joins the part of the digestive system that you have named in (ii) to B in the diagram.  
(iv) In which part of the digestive system is water absorbed? Give another function of this part of the digestive system. (24)
13. (a) (i) Identify X and Y in the following equation which is a summary of aerobic respiration.  

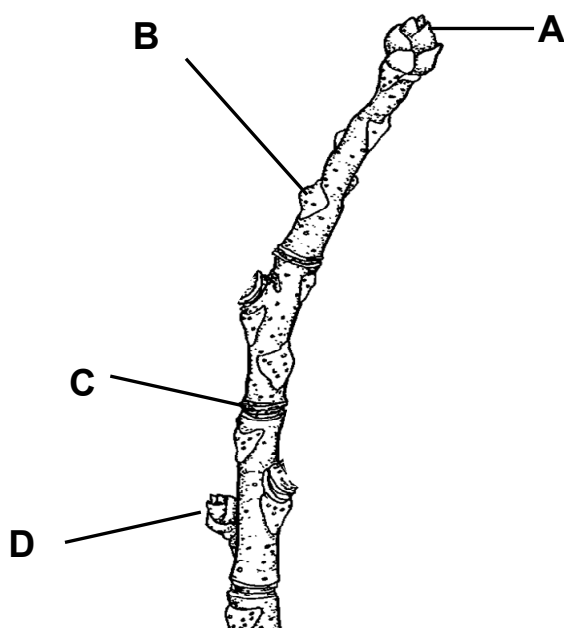
$$\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{X} \longrightarrow 6\text{Y} + 6\text{H}_2\text{O}$$
  
(ii) What is anaerobic respiration? (9)
- (b) Answer the following questions in relation to aerobic respiration as a two stage process.  
(i) Where in the cell does the first stage take place?  
(ii) Does the first stage require oxygen?  
(iii) Comment on the amount of energy released in the first stage.  
(iv) Where in the cell does the second stage take place?  
(v) Does the second stage require oxygen?  
(vi) Comment on the amount of energy released in the second stage.  
(vii) State **two** ways in which the energy that is released is used in the human body. (24)
- (c) (i) Describe how you used yeast to produce alcohol (ethanol). Include a labelled diagram of the apparatus that you used.  
(ii) How did you show that alcohol had been produced? (27)

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14. Answer any **two** of (a), (b), (c).

(30, 30)

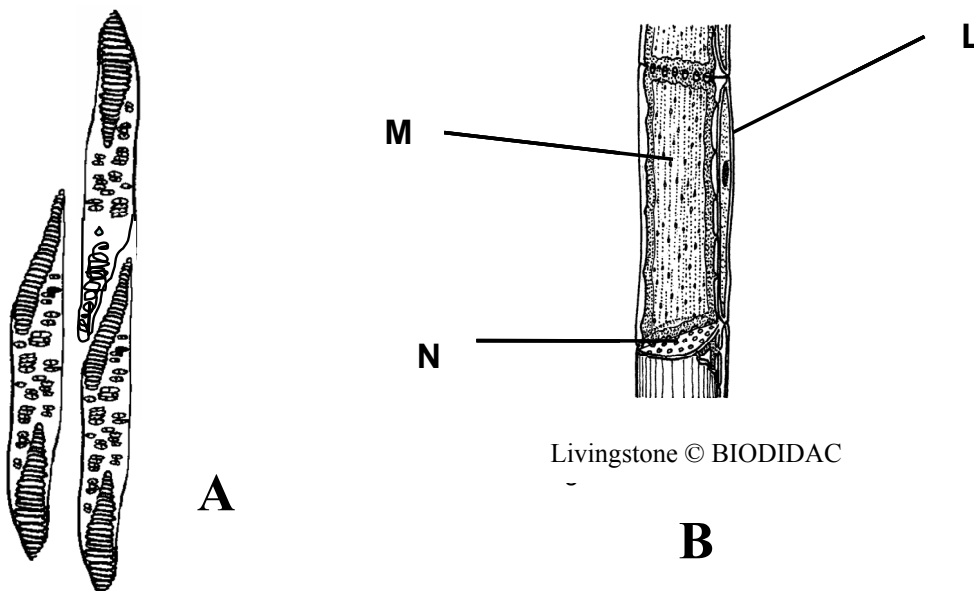
(a) The diagram shows the structure of part of a stem.



[Adapted from Livingstone © BIODIDAC]

- Identify A, B, C and D.
- What is a meristem?
- Give a location of a meristem in the diagram.
- How many years' growth are shown in the diagram? Explain your answer.
- Give **two** functions of a stem.

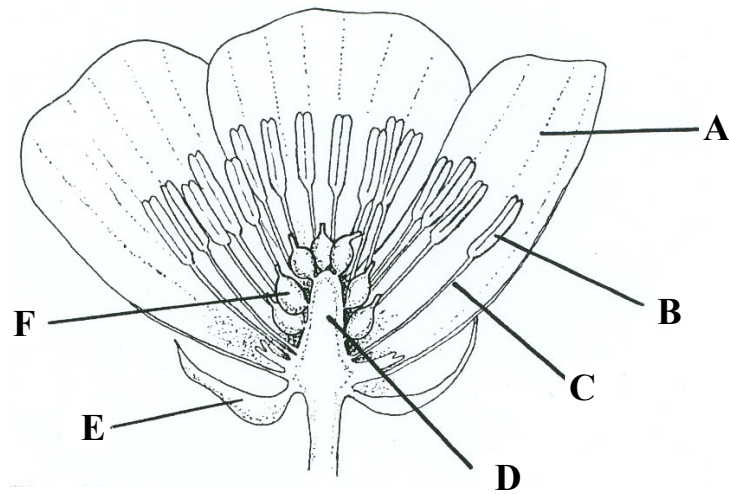
(b) The diagrams are of two tissues of a flowering plant.



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- Identify tissues A and B.
- To which tissue type do A and B belong?
- Identify cells L and M and part N in tissue B.
- Name a substance transported in tissue A.
- Name a substance transported in tissue B.
- Tissue A has another function in addition to transport. What is this other function?
- Where in a young root would you find tissues A and B?

- (c) The diagram shows a vertical section through a flower.

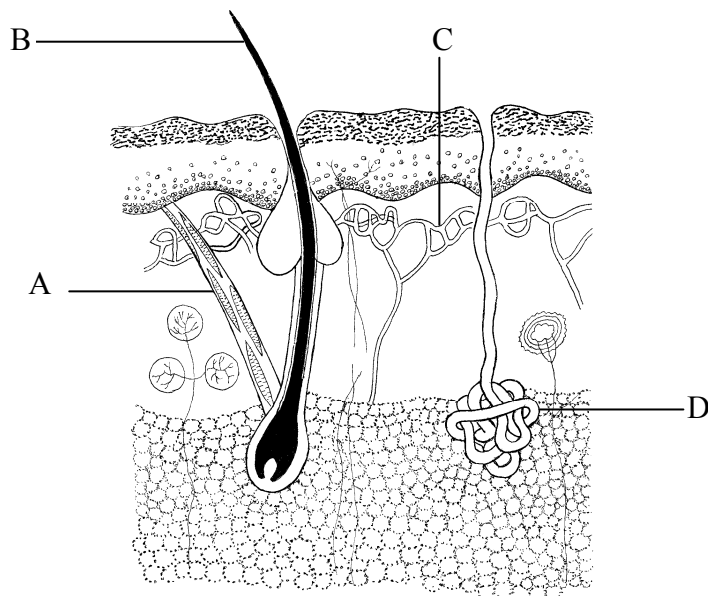


- (i) Identify parts A, B, C, D, E and F.
- (ii) What is the function of A? Give **two** ways in which it may be adapted for this function.
- (iii) In which part is pollen produced?
- (iv) Give **two** ways in which pollen may be transported to another flower.
- (v) What forms in F after pollination and fertilization?

15. Answer **any two** of (a), (b), (c).

(30, 30)

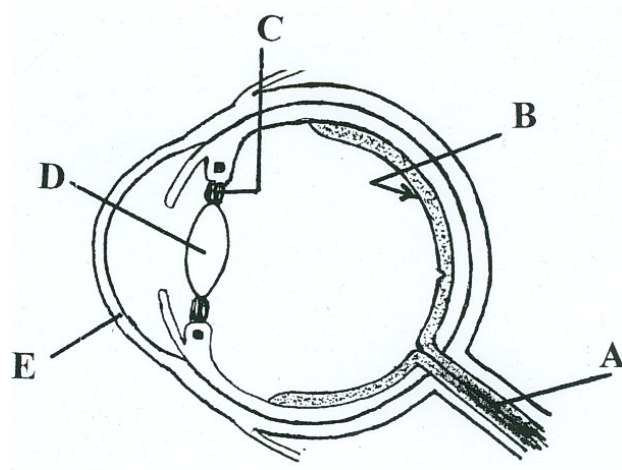
- (a) The diagram shows a vertical section through human skin.



- (i) Identify parts A, B, C and D on the diagram.
- (ii) The human being is an endotherm. What does this mean?
- (iii) What is the main source of body heat in endotherms?
- (iv) Describe the role of D in relation to body temperature.
- (v) What happens to the small arteries (arterioles) in the skin when the external temperature drops?

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- (b) The diagram shows a vertical section through the human eye.



- (i) Name A, B, C, D and E.
  - (ii) In which of these parts would you find rods and cones?
  - (iii) Give **one** function of rods and **one** function of cones.
  - (iv) What is the function of A?
  - (v) What type of lens is used to correct long sight?
- (c)
- (i) State **two** functions of the human skeleton.
  - (ii) The vertebrae form part of the axial skeleton. Name the vertebrae found in:
    - 1. The neck,
    - 2. The small of the back.
  - (iii) Name the part of the central nervous system that runs through the vertebrae.
  - (iv) Name the **three** bones that form the human arm.
  - (v) Write a short note (about five lines) on **one** of the following:  
arthritis or osteoporosis.